THE PAPER INDUSTRY
and PAPER WORLD
EDUCATIONAL NEWS MAGAZINE — APRIL, 1945

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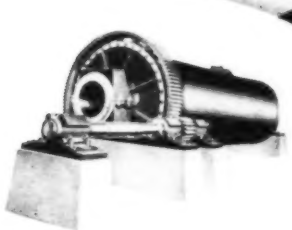

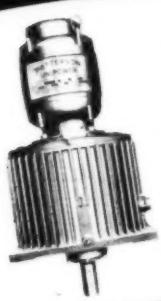

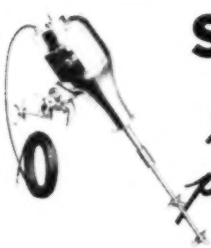

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Richard L. Cameron
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THE PATTERSON FOUNDRY & MACHINE CO.
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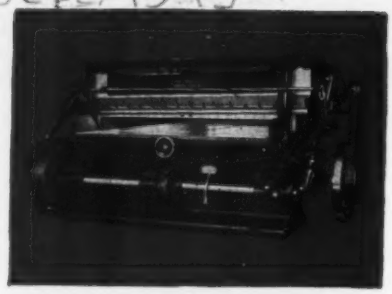

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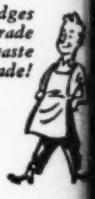
That's my trade
With minimum waste
On any straight blade!



THE COUPON BELOW can be very important to you — because it will bring you the details of the SEYBOLD Reserve Order Plan for speeding the delivery of your SEYBOLD machine after the war. Play safe and mail it today!

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Please send us your Purchase Proposal form which gives complete details of your Reserve Order plan.

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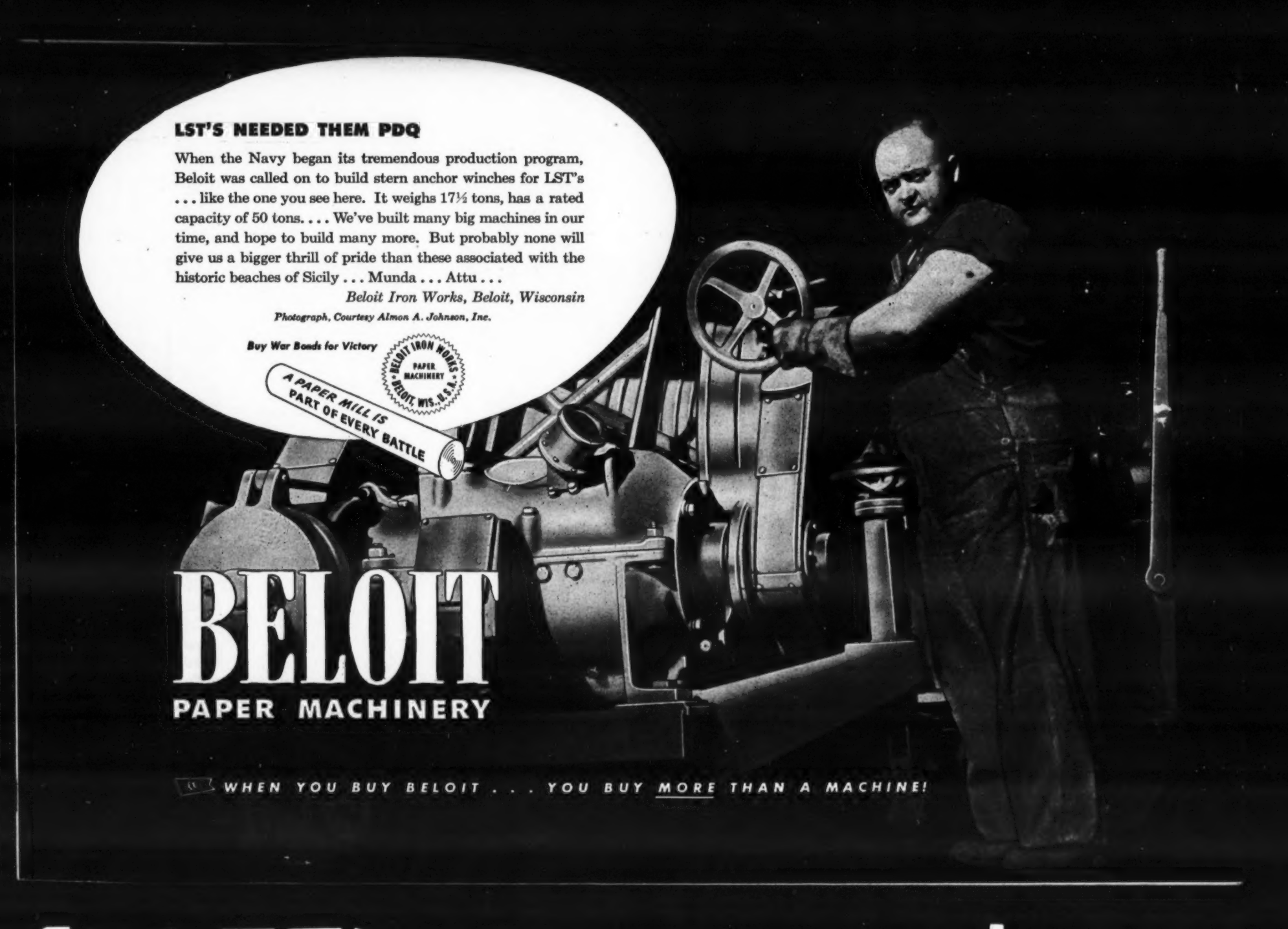
LST'S NEEDED THEM PDQ
When the Navy began its tremendous production program, Beloit was called on to build stern anchor winches for LST's . . . like the one you see here. It weighs 17½ tons, has a rated capacity of 50 tons. . . . We've built many big machines in our time, and hope to build many more. But probably none will give us a bigger thrill of pride than these associated with the historic beaches of Sicily . . . Munda . . . Attu . . .
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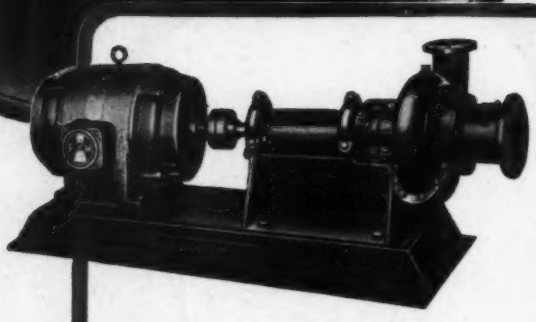
Paste THIS in Your Hat!

It pays to buy complete pumping units—built, guaranteed and serviced by one manufacturer



This motor-driven, horizontal, paper stock pump is one of a full line of Fairbanks-Morse *complete* pumping units for every purpose.

FAIRBANKS-MORSE complete pumping units offer you more than lastingly efficient pumps. They offer you, in addition, these three vitally important advantages:

1. **Assurance of prescribed performance.** Designed and built in one factory, pump and driver (motor or engine) are perfectly matched, correctly aligned, tested as a unit, and covered by a single guarantee.
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To benefit from these major advantages, consult a Fairbanks-Morse engineer about your pumping requirements. Write Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois.

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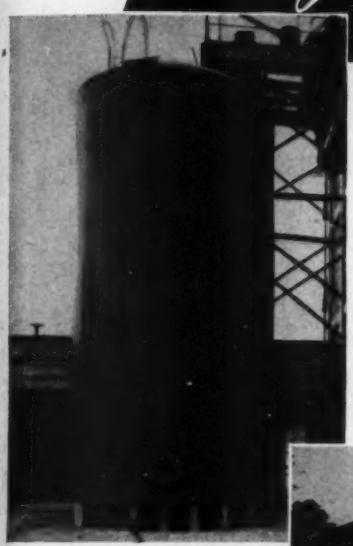
NOW IS THE TIME TO INSTALL THE NECESSARY STORAGE TANKS TO INCREASE YOUR MILL CAPACITY

Let us quote you on your requirements



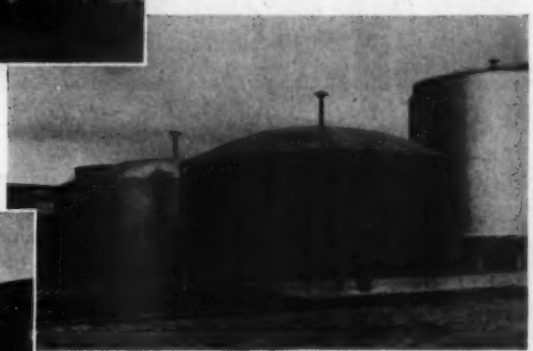
WE are equipped to fabricate and erect all types of steel tanks and plate work for the paper industry. The photos shown here represent typical flat-bottom tanks for liquid storage which we have supplied. All of them are of modern, welded-steel construction and were built to meet specific paper mill requirements.

In addition to flat-bottom tanks for water or chemical storage, we build elevated water tanks, welded steel pipe, diffusers, bins, digesters, cookers and standpipes. Address our nearest office for information or quotations.

Above — A 40,000-gal. hot water tank which we erected at a paper mill in Florida.

Left—A 40-ft. diam. by 20-ft. water storage tank providing suction for a fire pump at a paper mill in Arkansas.

Below—We erected this group of tanks at a Georgia pulp mill. They include two tanks 30 ft. diam. by 29 ft., and one tank 40 ft. diam. by 20 ft. for liquor storage and a vapor tank 20 ft. in diam. by 25 ft. In the background is a 50,000-gal. elevated water tank.



Above—Two 33-ft. diam. by 13-ft. 6-in. tanks for black liquor storage at a mill in Florida. They are of welded construction and are equipped with umbrella roofs.

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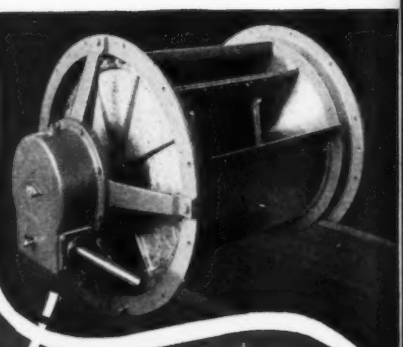
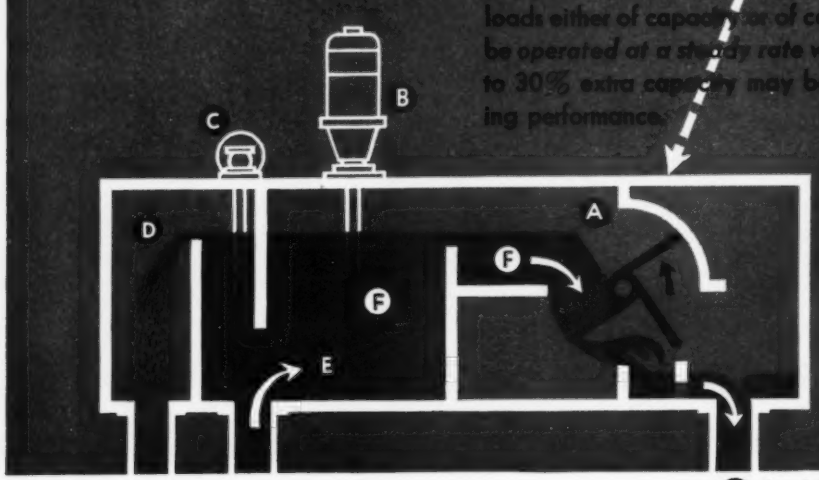
WITH AN **Impco Stock Meter**



Gain up to 30% extra capacity

Most pulp and paper making equipment is rated conservatively so that it has a margin of capacity to absorb peak loads either of capacity or of consistency. If a machine can be operated at a steady rate well up towards its peak, up to 30% extra capacity may be obtained without penalizing performance.



A Impco Metering Device
B Consistency Regulator
C Dilution Valve
D Overflow
E Stock of Variable Consistency and Flow
F Stock of Regulated Consistency

G Stock Discharged at Steady Flow, Regulated Consistency at Measured Rate

THE Stock Meter is an adjustable volumetric measuring device which enables you to realize this extra capacity from your equipment. Preceded by a consistency regulator it gives a fixed flow of a regulated consistency and thus uniform tonnage control.

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(2) Ahead of Screen rooms to maintain a steady load on screens—*the most important consideration for pulp cleanliness.*

(3) To govern the rate of stock flow through bleach plants so that chemicals can be properly apportioned—*the first step in getting high brightness with minimum strength loss.*

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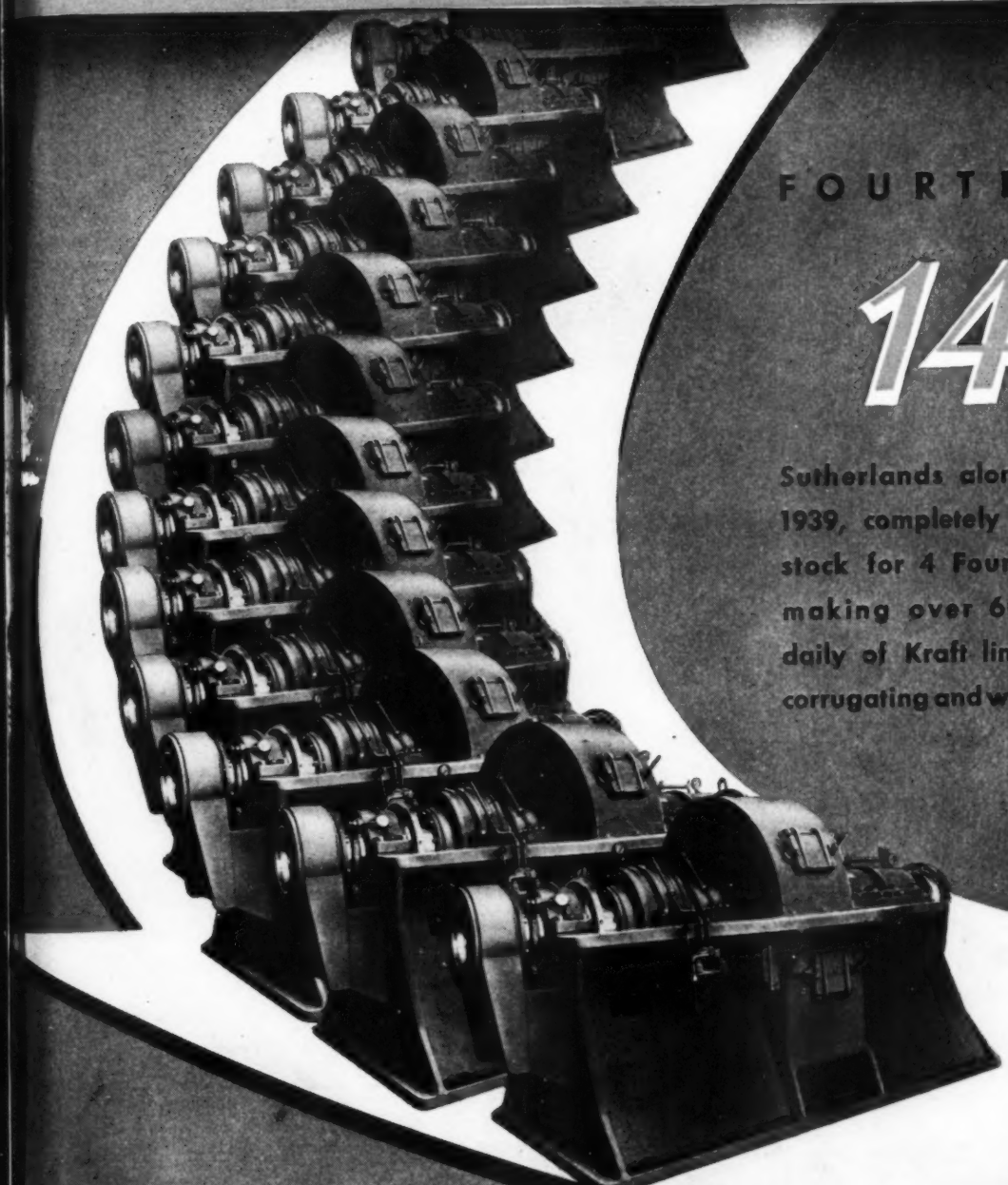

FOURTEEN

14

Sutherlands alone, since 1939, completely prepare stock for 4 Fourdriniers making over 600 tons daily of Kraft liner, bag, corrugating and wrapping.

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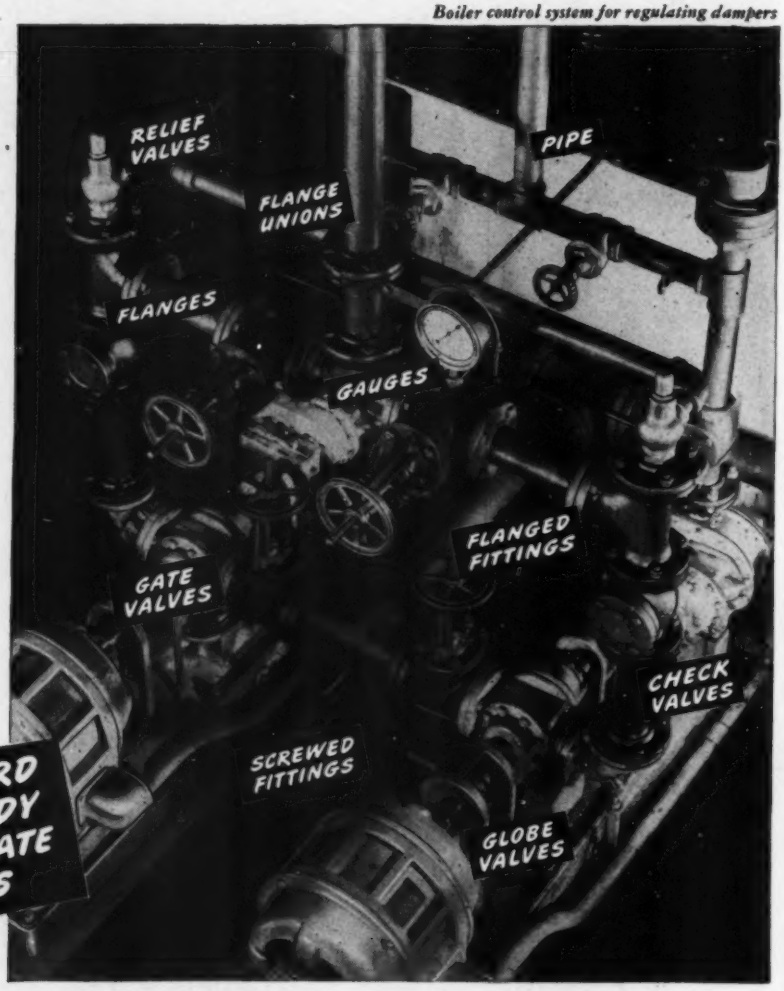

SERVICE RECOMMENDATIONS: **Crane Standard Iron Body Wedge Gate Valves** with Brass trim are recommended for steam, water or oil lines; all-iron valves for oil, gas or fluids that corrode brass but not iron. Made in O.S.&Y. and Non-rising Stem patterns.

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Size of Valve	Screwed or flanged end valves		Hub end valves
	Saturated Steam	Cold water, oil or gas, non-shock	Cold water or gas, non-shock
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14 & 16 in.	125 pounds	150 pounds	150 pounds
18 to 24 in.	*	150 pounds	150 pounds

*For steam lines larger than 16-in., Crane 150 pound Cast Steel Gate Valves are recommended. (For sizes under 2 in., use Crane Clamp Gate Valves.)

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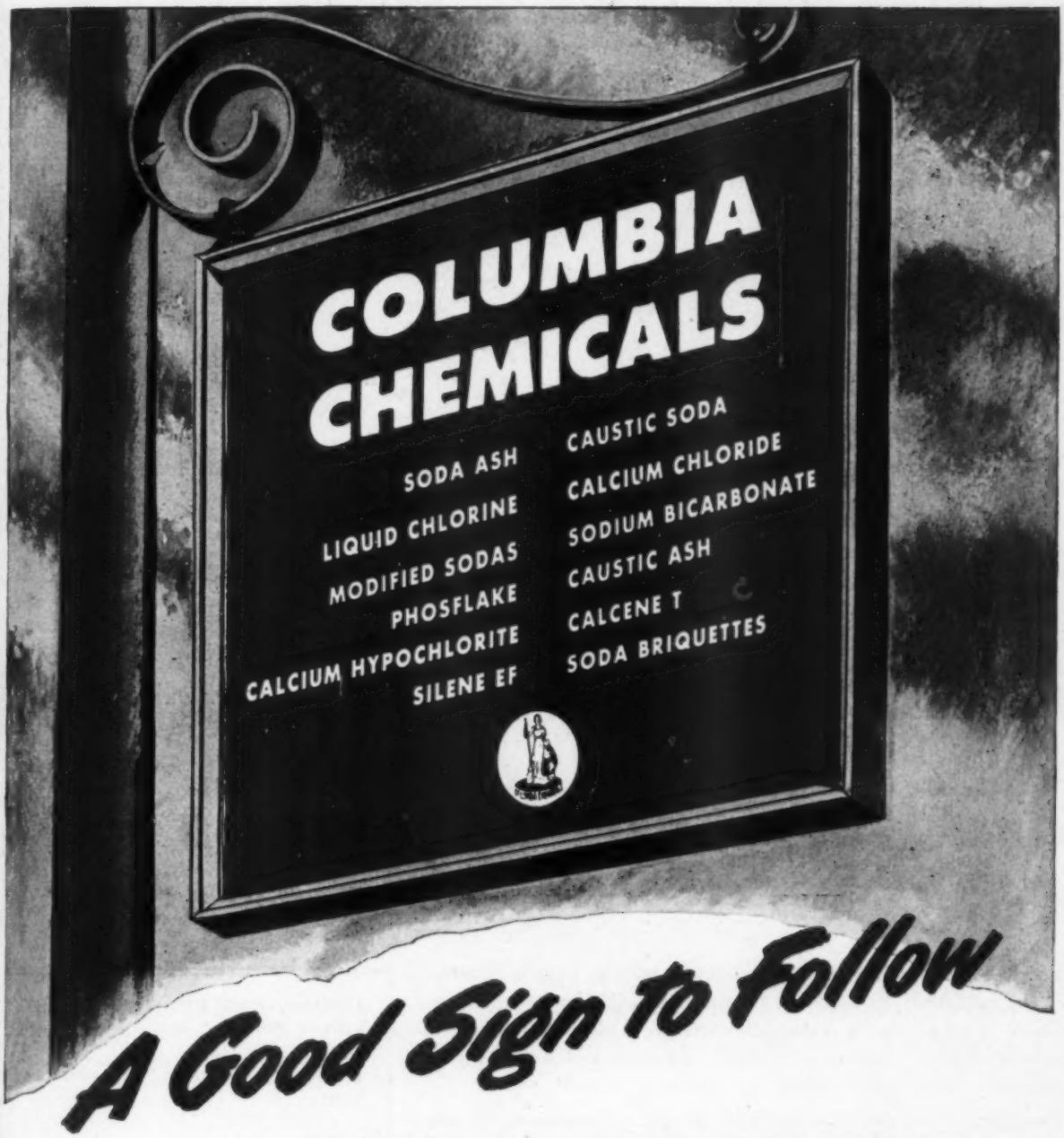

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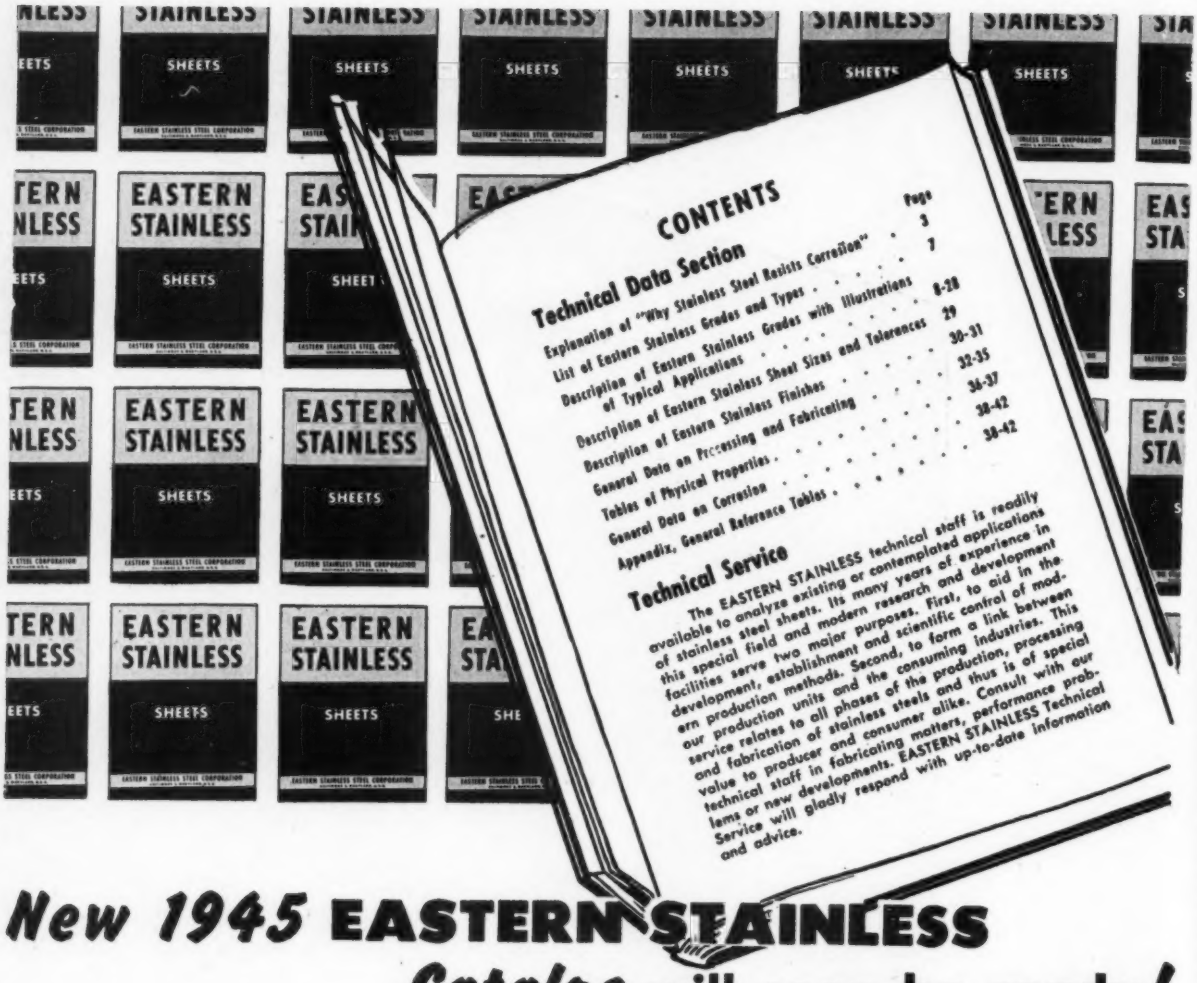
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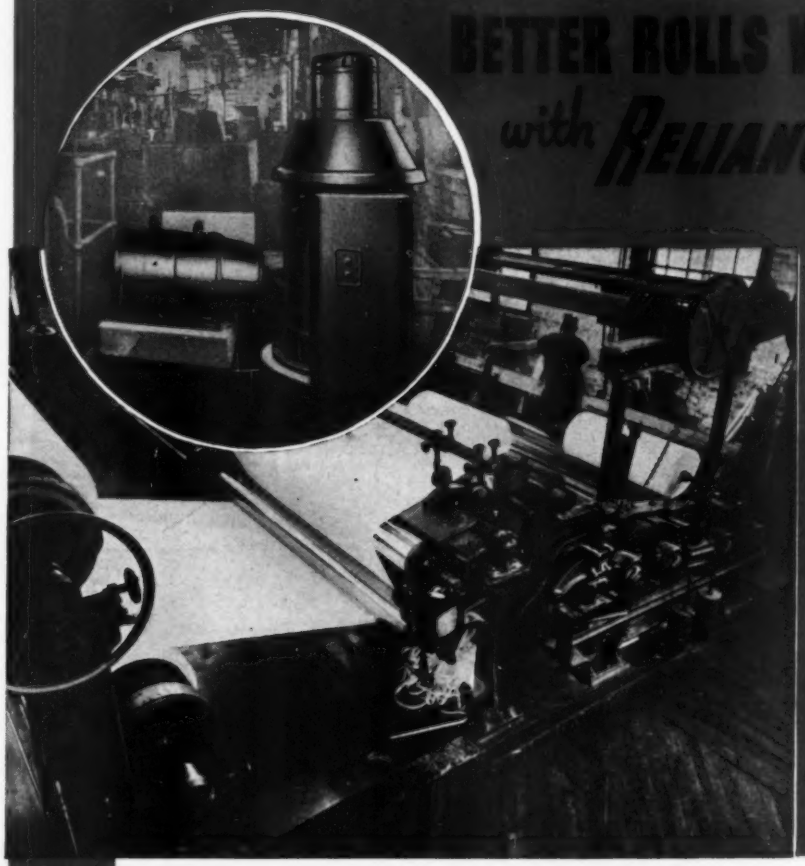

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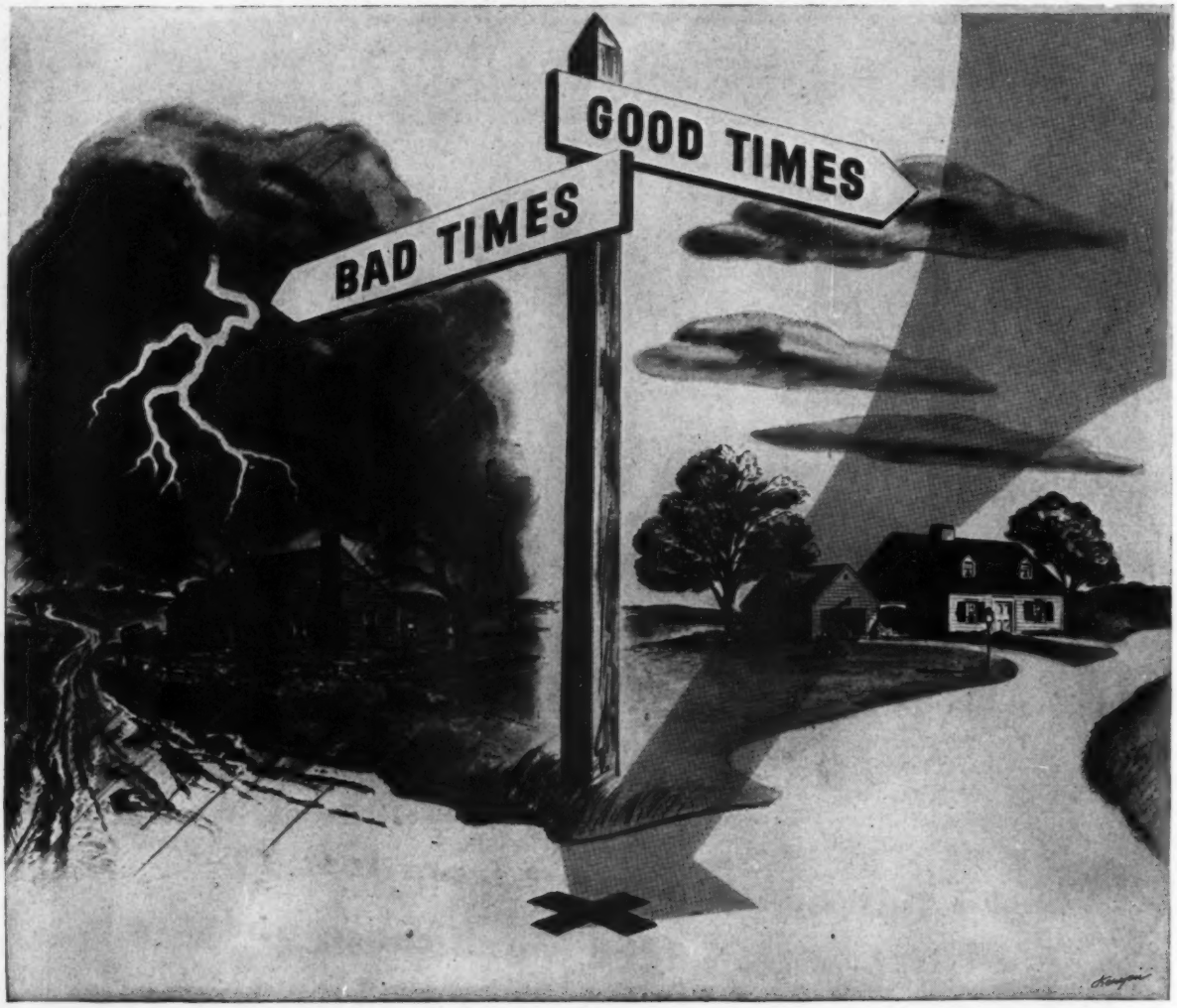

Here's where you stand today!

Look ahead a year or two...for your own sake.

Over on the dark side is this: Every unnecessary thing you buy helps shove the country one step nearer inflation and the bad times that come in inflation's wake.

Over on the bright side is this: Every single cent you save helps move you and your country one step nearer the kind of prosperous, happy, post-war America you want.

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YOU SHOULD. Because if every man Jack (and every girl Jill) buys nothing he can get along without . . . (avoids Black Markets and "just-a-little-above-the-ceiling" like the plague!) . . . pays off the mortgage or any other debts . . . takes out more insurance . . . builds a healthy sock of savings . . . buys and holds more War Bonds—inflation will stay away from our door.

And Jack and Jill will be in a sound position no matter what times come.

Maybe you ought to clip this signpost and paste it in your pocketbook as a reminder that you can BUY your way to bad *times. Or you can SAVE your way to* good *ones.*

That's where YOU stand today.

4 THINGS TO DO to keep prices down and to protect your own future!

1. Buy only what you really need.
2. When you buy, pay no more than ceiling prices. Pay your ration points in full.
3. Keep your *own* prices down. Don't take advantage of war conditions to ask more for your labor, your services, or the goods you sell.
4. *Save.* Buy and hold all the War Bonds you can afford—to help pay for the war and protect your future. Keep up your insurance

HELP US KEEP PRICES DOWN

A United States War message prepared by the War Advertising Council; approved by the Office of War Information; and contributed by this magazine in cooperation with the Magazine Publishers of America.

TRADE WINDS

Pulp Allocation Down on Some Papers — Up on Others

▶▶▶ LOWER ALLOCATIONS of wood pulp for the second quarter will result in a reduction of the amount of paper available in certain civilian items such as cultural or printing papers, wrapping paper, paper bags, household towels and napkins and facial tissues.

The announcement, given out March 24 by the WPB, stated that: These reductions were found necessary in order to overcome the existing pulp shortage and meet essential military paper and paperboard requirements, WPB officials explained. Increased production of containerboard, used in the manufacture of V boxes and of certain essential industrial papers, building paper and paperboard, and miscellaneous boards is made possible by the curtailment of the less essential papers.

Specific allocations of pulp for the second quarter, have been completed and mailed to the mills of the pulp and paper industry. In implementing the Program Determination of the WPB Requirements Committee, announced on March 14, the Forest Products Bureau found it necessary to curtail the over-all use of wood pulp during the second quarter by approximately 82,000 tons below the amount originally authorized for use during the first quarter. This figure is the difference between curtailments in nine categories, and increases in five.

The principal reductions in authorized pulp usage by major segments of the industry as compared with the original first quarter use authorizations are as follows:

	Tons
Groundwood Printing Paper	5,000
Book Paper	32,000
Fine Paper	9,000
Coarse Paper	40,000
Shipping Sack Paper	5,000
Sanitary Papers	12,000
Tissue Papers	5,000
Absorbent Paper	2,000
Folding Boxboard	2,000
Total Reductions	112,000

Increased pulp authorizations are allowed as follows:

	Tons
Special Industrial Paper	3,000
Building Paper	3,000
Containerboard	14,000
Miscellaneous Boards	4,000
Building Board	6,000
Total Increases	30,000

The Pulp Allocation Office further stated that changes in authorizations for individual grades of paper within the above segments varied considerably. In the coarse paper field, the second quarter wood pulp authorizations were below the original first quarter authorizations by 2,700 tons in butchers paper, 7,300 tons in unbleached kraft wrapping paper, 2,900 tons in other wrapping paper, 27,700 tons in grocery and variety bag paper, 1,900 tons in envelope paper, 2,200 tons in gumming paper, 2,600 tons in waxing paper over substance weight 18 lbs., and 3,400 tons in other converting paper.

Authorizations for asphalting paper and base stock for Ordnance wrap, where there are heavy military requirements, were increased over the first quarter by 9,100 tons and 3,200 tons respectively.

In the sanitary field, authorizations for toilet tissue, industrial toweling, and industrial napkins were maintained at approximately the first quarter level, but pulp authorized for household toweling was reduced by 1,900 tons, household napkin stock by 1,500 tons, and facial tissue by 4,000 tons.

The reduction in market wood pulp authorizations, it was stated, did not exceed 10 per cent below the original first quarter level in the case of most semi-integrated and non-integrated mills, without pulp making plants. Wholly integrated mills, operating their own pulp plants, in certain instances had withholding of wood pulp from their own use increased from a maximum of 15 per cent to a maximum of 20 per cent, in an effort to equalize the war burden of Lend-Lease, export, and nitrating pulp between the integrated mills as a class and the market pulp consuming mills as a class. In balancing out the delivery allocations, however, the Pulp Allocation Office stated that it was found possible to avoid directing any integrated company to deliver for market purposes more than 15 per cent of its combined production of chemical pulps at all its mills.

If it is not necessary to allocate the balance of withheld tonnage to the market during the quarter, the Forest Products Bureau expressed its willingness to entertain appeals from the companies involved to consume this difference in their own operations for

the manufacture of paper and paperboard deemed necessary to the war effort. Pulp producing mills were urged to increase their wood pulp production if possible, and all mills were requested to take full advantage of the intensified waste paper salvage program without which the second quarter programs cannot be met in full.

The Pulp Allocation Office paid tribute to the excellent co-operation and constructive advice received from the Wood Pulp Allocation Industry Advisory Committee during the three years it has been in existence.

▶▶▶ THE RATIO OF United States paper production to mill capacity for the week ending March 31, 1945, as reported by the American Paper and Pulp Association was 88.9 per cent compared with 92.1 per cent for the preceding week and 85.7 per cent for the corresponding week a year ago. Paperboard production was 100 per cent for the current week compared with 99 per cent for the preceding week, and 93 per cent for the corresponding week a year ago.

BENTON R. CANCELL MADE DIRECTOR OF FOREST PRODUCTS BUR.

The appointment of Benton R. Cancell as director of the Forest Products Bureau was announced March 14 by Harold Boeschenstein, vice chairman of WPB Operations.

Mr. Cancell went to WPB in May, 1943, as an industrial specialist in the Pulp and Paper Division, and since November, 1944, has been serving in the capacity of deputy director of the Forest Products Bureau.

In private life, Mr. Cancell is assistant to the president of the St. Regis Paper Company.

ACTION PENDING ON EXTENSION OF RECIPROCAL TRADE AGREEMENT ACT

The long expected bill to extend the Reciprocal Trade Agreement Act has been introduced and hearings will be held in April. The bill would extend the life of the present agreement three years, and permit cuts in duties of 50 per cent of the rates in effect January 1, 1945. Typical of the effect of this bill would be that it enables a reduction in the rate of duty on printing papers to $2 per ton and 2½ per cent. The rate fixed in the Tariff Act of 1930 was $5 per ton and 10 per cent, later cut by a Canadian agreement to $4 per ton and 5 per cent. This would be equivalent to about 11 per cent. Canada levies a duty of 22½ per cent on these grades.

The situation is the same with regard to other papers. The Administration will make a vigorous effort to secure the passage of this bill, but there will be a loud protest from many industries which see that the effect on them may be the opening of American markets to foreign producers paying only a fraction of American wage rates.

▶▶▶ THE BOREN SUB-COMMITTEE of a Congressional Committee has been holding hearings on the policy of the Administration's efforts to ship large quantities of pulp abroad at a time when there is an American shortage. Government agencies have been the principal witnesses in an effort to justify their requests for such exports.

▶▶▶ WASTEPAPER collections have increased in recent weeks owing to the renewal of strenuous efforts to salvage such material, and also to the manner in which collections were tied up by bad weather conditions in January. The shortage, however, is still acute, and not sufficient to make up the raw material deficit caused by a shortage of wood pulp.

BIG CUT IN PAPER WILL FOLLOW 2ND QUARTER PULP CUT

The American Paper and Pulp Association has published data showing that the reduction of pulp allocated for paper production in the second quarter will cut minimum production of paper to 1,951,320 tons as compared with 2,030,000 tons in the first quater. A total of 2,599,700 tons of pulp was allocted for the second quarter as compared with 2,681,650 tons in the first quarter. Paperboard minimum production is set at 2,419,917 tons in the second quarter as against 2,371,963 tons in the first quarter. Minimum paper production in the second quarter as compared with that fixed for the first quarter is shown below:

	First Quarter	Second Quarter
Newsprint	180,000	180,000
Groundwood and Book	487,500	451,900
Fine	240,000	234,600
Coarse	461,000	438,770
Shipping Sack	96,000	91,250
Special Industrial	60,000	62,500
Sanitary	206,500	197,700
Tissue	37,000	31,400
Absorbent	26,000	23,500
Building Paper	236,000	239,700
Total	2,030,000	1,951,320

Total pulp exports, including the Foreign Economic Administration and the Army will be cut to 60,863 tons as compared with an authorization for the first quarter of 61,281 tons.

▶▶▶ THREE NEW BILLS on patents recently were introduced in Congress by Rep. Boykin (D. Ala.), chairman of the House Committee on Patents. The National Association of Manufacturers has announced its endorsement of these bills which are intended to carry out recommendations made by the National Patent Planning Commission and are similar to proposals which have been advocated for some time by the NAM Committee on Patents.

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FINANCIAL

An apparent approach of the end of the war in Europe, coupled with a series of unfounded peace rumors combined with Administration efforts to check speculation caused a sudden drop in securities values at the end of March. Reports of restrictions on stock trading, increased margin requirements or some other such curb on speculation, contributed to the unloading of long holdings by operators speculating for a rise, as a hedge against inflation.

American Box Board Company—Net income in 1944 was $285,809 at against $198,622 in 1943.

A. P. W. Paper Company—for 28 weeks ending January 31, net income was $60,218 as against $32,967 in the comparable period of the preceding fiscal year.

American Writing Paper Corporation—Net profit in 1944 was $184,312 against $244,966 in 1943.

Celotex Corporation—Net profit for the quarter ending January 31 was $137,311 as against $81,885 for the comparable quarter of the preceding fiscal year.

Certain-teed Products Corporation—Net income was $692,169 as against $750,249 in 1943.

Champion Paper & Fibre Company—Net profit for twelve weeks ending February 4 was $429,181 as against $325,387 for the comparable period in the previous fiscal year.

Crown Zellerbach Corporation—Net income for nine months ending January 31 was $5,399,620 as against $5,656,174 for the comparable period in the preceding fiscal year.

Eastern Corporation—Net income in 1944 was $560,459 as against $491,698 in 1943. The company has set aside $2,000,000 for postwar construction.

PAPER · · · America's 6th Industry

PAPER GUARDS ARMY SUPPLIES

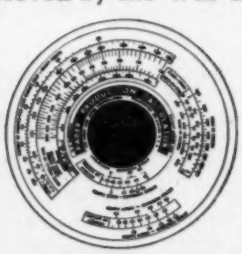
(NEWS ITEM: *Paper and burlap laminated is replacing critical cotton duck in the manufacture of Tarpaulins.*)

The Army QMC has developed tarpaulins made of olive-drab, high wet-strength Kraft paper and burlap fabric laminated to shelter military equipment and supplies. Asphalt is used as an adhesive and additional waterproofing agent. The adoption of these new tarpaulins was made necessary due to inability to secure sufficient production of cotton duck.

Paper for parachutes . . . Paper for maps . . . Paper for packaging . . . Paper for printing plates . . . New uses for paper, calling for new standards of lightness and toughness, new standards of quality in performance. New responsibilities—new opportunities for the Pulp and Paper Industry.

Puseyjones men and production facilities are at War—and Industry at War is Industry thinking and working at hitherto unheard of speeds. Our Research and Development Committee, working on the problems of America at War, is finding many practical and technical advantages that will be of incalculable value to America at peace—to the Paper-Making Machinery of the future.

We are in a position to repair or modernize existing machines where essential to the war effort and as approved by the War Production Board.



The new Puseyjones Paper Production CALCULATOR is yours for the asking. A time saver for superintendents, engineers, executives or other interested members of your organization.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Wilmington 99, Delaware, U. S. A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

DETROIT PUBLIC LIBRARY

Robert Gair Company, Inc.—Net profit for 1944 was $916,100 as against $1,064,486 in 1943. Plans are under way for the issuance of $5,000,000 in first mortgage bonds of which a material portion will be used to redeem $3,350,000 in income notes. Holders of income notes will be allowed to exchange these notes on the basis of five shares of preferred and five share of common stock for each $100 of the income notes.

P. H. Glatfelter Company—Net income in 1944 was $174,712 as against $175,666 the year before.

Hammermil Paper Company—Net income in 1944 was $453,395 as against $585,028 in 1943.

Hawley Pulp and Paper Company—Net income in 1944 was $141,871 as against a net loss in 1943 of $144,840.

Hinde & Dauch Paper Company—Net income in 1944 was $960,255 as against $996,530 in 1943.

Kimberly-Clark Corporation—Net profits for 1944 were $1,853,000 as against $1,801,000 in 1943. The earnings of $3.09 per share compared with $3.69 in 1943 are explained by the fact that the number of outstanding shares was materially larger in 1944.

Masonite Corporation—Net income for the six months ending February 28 was $612,480 as against $509,719 in the comparable period of the preceding fiscal year. Earnings for the quarter ending February 28 were $295,270 as against $227,164 in the preceding year.

Munising Paper Company—Net profit for 1944 was $132,803 as against $160,565 in 1943.

Nashua Gummed and Coated Paper Company—Net income for 1944 was $641,907 as against $70,363 in 1943.

National Container Corporation—Net income in 1944 was $1,190,991 as against $816,997 in 1943. Income for the quarter ending December 31, 1944, was $269,099 as against $232,011 for the comparable quarters in 1943.

Oxford Paper Company—Net earnings for 1944 were $899,195 as against $838,988 in 1943.

Puget Sound Pulp & Timber Company—Net income in 1944 was $938,288 as against $456,650 in 1943.

River Raisin Paper Company—Net income in 1944 was $220,044 as against $213,886 in 1943.

St. Regis Paper Company—Net income in 1944 was $1,853,513 as against $1,855,927 in 1943, despite the fact that sales increased from $25,527,784 to $48,388,277. Income taxes and increased production costs were responsible for this diversity between income and sales.

San-Nap-Pak Manufacturing Company—Net income in 1944 was $94,341 as against $90,181 in 1943.

Schumacher Wall Board Corporation—Net income for nine months ending January 31 was $105,727 as against $111,539 for the comparable period the preceding fiscal year.

Scott Paper Company—Net profit in 1944 was $1,566,220 as against $1,534,926 in 1943.

Taggart Corporation—Net income in 1944 was $485,548 as against $584,321 in 1943.

U. S. Envelope Company—Net earnings in 1944 were $791,229 as compared with 1943 net of $811,208.

S. D. Warren Company—Net income in 1944 was $760,215 as against $509,246 in 1943.

West Virginia Pulp & Paper Company—Net income for the quarter ending January 31 was $538,738 as against $623,6[illegible]5 for the comparable quarter in the preceding fiscal year.

New York Stock Exchange—Stocks

	Closing Prices March 26	Feb. 26
A. P. W. Products...	4¾	5⅝
Celotex	15	16
Same Preferred ...	20	19⅞
Certain-teed Products	7½	8½
Same Preferred ...	145½	147
Champion P&F Co...	30	33¾
Same Preferred ...	111½	113
Container Corp.	27	28⅞
Cont. Diamond	10⅜	12
Crown Zellerbach ...	20⅜	22
Same Preferred ...	103½	104¼
Dixie Vortex	17½	*19-19½
Same "A"	*47-48	*48¾-49
Robert Gair	5⅛	6⅜
Same Preferred ...	16⅛	17½
Gaylord Container ..	24½	30⅜
Same Preferred ...	*56-58½	*58½-60½
International Paper .	21⅝	24⅛
Same Preferred ...	88⅛	90¾
Kimberly-Clark	41¾	45½
McAndrews & Forbes	32	*31¾-32
Masonite	40	43¼
Mead Corp.	12½	14
Same Preferred ...	*101½-104	*100-101
National Container ..	14	14
Paraffine Cos.	64½	60¼-61
Same Preferred ...	109	109
Rayonier, Inc.	16	18⅝
Same Preferred ...	35⅝	35½
Scott Paper	*43-44½	*42⅝-43¼
Same 4½% Pref....	110-112½	*111-113
Same 4% Pref.....	*109¼-112	109
Sutherland Paper ...	*32¼-33⅛	33½
Union Bag & Paper..	14½	15⅝
U. S. Gypsum.....	79⅛	85
Same Preferred ...	186	183
West Va. P&P Co....	23	*26¼-26½
Same Preferred ...	111	*110⅛-110½

New York Stock Exchange—Bonds

Abitibi 5%	101	102½
Celotex 3¾%	...	103⅜
Certain-teed 5½% ...	...	103⅛
Champion P&P Co....	...	...
Intl. Paper 5%.....	...	104¾
Same 6%	110	109½

New York Curb Exchange—Stocks

Am. Writing	8	6¾
Great Northern	35⅝	38¼
Hummel Ross	7⅝	8⅛
St. Regis	...	6⅝
Taggart	...	6¾
United Wall Paper...	4⅜	5⅛

*Closing Bid and Asked prices.

HOLYOKE MILLS ACT TO IMPROVE PORT OF BOSTON FACILITIES

Paper manufacturers in Holyoke, Massachusetts, are taking an important part in a campaign being conducted by the Port of Boston Authority to secure state backing for much needed improvements in that port's facilities with a view to substantial savings for manufacturers throughout the State. It is hoped that improved docking facilities costing $15,000,000 can be constructed after the war.

It is felt that savings in shipment of raw materials by water would place the Holyoke paper manufacturers in a better competitive position. Savings of shipments of wood pulp to Holyoke by way of Boston, rather than by New York, amount to 60 cents a ton. The cost of shipping wood pulp from the Pacific Coast to Holoyoke by rail is $1.40 a ton more than by boat through the Panama Canal and by boat through Boston.

Holyoke industrialists serving on a committee to promote the improvement of the Boston port facilities are: E. C. Reid, vice president, American Writing Paper Corporation; E. C. Tucker, vice president, Chemical Paper Manufacturing Company; Harry A. Feldbush, vice president, Worthington Pump & Machinery Corporation; C. H. Kent, Hercules Powder Company; and J. N. McDowell, Carew Manufacturing Company.

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▶▶▶ A BOOKLET recently distributed by Kimberly-Clark Corporation, Neenah, Wisconsin, is entitled "From Trees to Printing Presses." The title promises the reader just what he finds in this very interesting piece of work. The story is, of course, abridged, but it is well done and profusely illustrated. The use of color has given the book a pleasing appearance. A glossary of papermaking terms taken from *The Dictionary of Paper*, published by the American Paper and Pulp Association, is used at the end of the book. There are 24 pages, with an artistic cover.

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A GENERAL SPONSORS WASTEPAPER CAMPAIGN

The General Eisenhower-Boy Scout Wastepaper Program, with a goal of 300,000,000 pounds of scrap paper to be collected by Scouts throughout the nation in the period from March 1 through April 30, goes into the final stretch as the war reaches a climax.

This is the only wartime civilian program that General Eisenhower has sponsored personally. All Scouts and

PHILCO
gives you the latest in
Modern Battery
Design !
THOUSANDS of electric industrial trucks are now getting more work done at lower cost because of the advanced research of Philco engineers in developing tougher, more powerful storage batteries. Philco has long led in providing batteries of maximum capacity, with the rugged long-life construction especially engineered for today's heavier work schedules.
Now Philco engineering leadership is demonstrated anew with the storage battery that gives 30% longer life —the great new Philco "Thirty"! For lower cost in handling materials with electric trucks, be sure to include the new Philco "Thirty" in your plans. Now available in preferred types. Complete information gladly sent on request. PHILCO CORPORATION, Storage Battery Division, Trenton 7, New Jersey.
For 50 years a leader in Industrial Storage Battery Development
The new Philco "Thirty" with 30% longer life is identified by its distinctive red connectors.

Cubs collecting 1,000 pounds of paper will be awarded a medal bearing his likeness, and all Scout Troops and Cub Packs collecting an average of 1,000 pounds for each member will receive a shell case made of wastepaper returned to this country from a European battlefield. Each paper shell case will bear a citation signed by General Eisenhower.

Quentin Reynolds, noted war correspondent says:

"Anyone who thinks waste paper isn't important ought to view a battlefield. Sure, we used to throw it away, burn it, do anything to get rid of it. But today waste paper is a primary war material—and it's our No. 1 critical shortage. I can tell you: our fighting forces need waste paper now."

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LARGE ACREAGE BOUGHT BY CROWN ZELLERBACH FOR USE AS TREE FARM

A recent press report announces the purchase by the Crown Zellerbach Corporation of a tract of 47,000 acres of forest lands in Columbia County, Oregon.

The property will be operated as a tree farm on a sustained yield basis, bringing the total of tree farm acres owned by the company to 300,000.

Included in the purchase was 200 miles of logging railroad.

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▶▶▶ OFFICIAL ANNOUNCEMENT has been made that the Shelton (Wash.) plant of Rayonier, Inc., definitely will be reopened by next fall. This has been made possible due to a new supply of timber on the Olympic peninsula which has been obtained by the company. A crew of 75 men is now engaged in preparing the plant for reopening.

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NEW YORK CO. BUYS OLD EATON-DIKEMAN PROPERTY

The old Eaton-Dikeman paper mill property in Lee, Massachusetts, has been purchased by the Carl Schleicher and Schull Company, of New York City, manufacturer of filter paper. The sale was completed by Calvin C. Yates, president of the Eaton-Dikeman Company, now located at Mount Holly Springs, Pennsylvania. The price indicated on the transaction was approximately $6,000.

The property transferred includes approximately seven acres of land, with water rights and dam, plus several small buildings. These buildings were left intact when the main buildings of the Eaton-Dikeman Company were destroyed by fire in 1932.

The Schleicher & Schull Company operated in Germany from 1870 to 1913, when it transferred to this country. It is now American controlled. The company maintains local headquarters at the Hurlbut Paper Company in South Lee, Massachusetts, in connection with the acquisition of the Eaton-Dikeman property. It has made no announcement as to plans for use of the property, but it is assumed that a building is to be constructed on the site.

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PULPWOOD DEALERS OF SOUTH FORM ORGANIZATION

Increased and stabilized pulpwood production is the aim of the pulpwood Dealers' Association of the South, which was formed April 3 at an Atlanta (Ga.) meeting attended by dealers from South Carolina, Florida, Georgia and Alabama, representing 80 per cent of production in those states.

Anticipating a shortage of 1,300,000 cords of pulpwood this year, the new association announced it would use every possible means to stimulate production and would maintain a full-time staff and headquarters in Atlanta.

Albert Ernest, of Savannah, was elected president; Horace Tindel, of Graceville (Fla.), vice president, and James M. Lawton, of Soperton (Ga.), secretary-treasurer.

Directors include C. P. Pearson of Troy, Alabama; Harley Langdale, Jr., Valdosta, Georgia; B. E. Pelham, Ellaville, Georgia; Craige Wall, Conway, South Carolina; S. A. Allen, Savannah; V. C. Walker, Hazelhurst, Georgia; R. T. Brassell, Allendale, South Carolina; Troy Brannan, Brewton, Alabama; C. B. Waller, Youngstown, Florida, and Leo Bateman, Camilla, Georgia.

A broadened program of reforestation, financed by a "reasonable" production tax on forest products, was recommended April 3 to the Florida Legislature by Gov. Millard Caldwell, who said:

"Steady progress has been made in recent years in the conservation of our timber supply but much remains to be done. Vast areas of forest lands remain barren and neglected. Modern methods of fire protection and reforestation are available to but a small percentage of Florida acreage which is or can be made productive. I recommend a broadened program of reforestation financed by a reasonable production tax on forest products. If such course is followed and the revenue plowed back into the industry by means of an effective reforestation program, we may safely anticipate a material increase in the income of the people from forests and forest products."

PACIFIC MILLS BUYS CANADIAN BOXES, LTD.

Pacific Mills Limited, with a pulp and paper mill at Ocean Falls, British Columbia, and a paper converting and processing plant at Vancouver (B. C.), has purchased the business of Canadian Boxes Ltd., Vancouver. The box company business will be operated as a wholly-owned subsidiary by the Pacific Mills.

P. E. Cooper has been named president of Canadian Boxes; Jack Young, vice president and treasurer; and James Lawson, secretary. Distribution and working staff will be continued with Charles H. Forster as sales manager; Roy Armstrong, office manager; and Gordon Sharpe, plant superintendent. J. H. McDonald retired recently as managing director. Ownership previously had been in Vancouver and in the East.

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▶▶▶ THE NAME OF the Rogers Paper Manufacturing Company, Manchester, Connecticut, has been changed to Rogers Corporation. As a reason for the change, it was explained by company executives that materials manufactured by Rogers, and the uses of these materials have been developed far beyond the narrow description given them by the old name of the company which was founded in 1932.

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NEW DEVELOPMENTS IN WEYERHAEUSER PULP MILLS

A new addition is under way at the Weyerhaeuser Timber Company's Pulp Division in Everett, Washington, which will enable the plant to turn out nitrating pulp. Cost of the addition, which will be in operation about July 1, will be approximately $500,000. It will produce 230 tons of nitrating pulp daily. Russell LeRoux is the resident manager; O. C. Schoenwerk, of Chicago, is the engineer.

Plans for converting waste liquor in the company's pulp mill at Longview, Washington, have been worked out, and the project will be started after the war. This announcement was outlined in addresses recently made by Norman Kelly, manager, and R. S. Hatch, of the research department, when these gentlemen spoke before the Longview Izaak Walton League.

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▶▶▶ THE PURCHASE OF some 12,500 outstanding shares of Canadian Boxes, Ltd., is announced by Pacific Mills, Ltd., Vancouver, British Columbia. The new company will be operated as a wholly-owned subsidiary of Pacific Mills. The purchase price was not announced.

LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . .

LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . .

It was easy to pick the right grease then...

When greasing a wagon or mill wheel was the only lubrication problem, and the principal choice of lubricant lay between bacon rind and axle grease, everyone was his own lubrication specialist. The oak or maple bearings on the old mill wheels could be replaced every winter, if needed. If the grease on wagon wheels became too stiff in cold weather, the horses pulled harder. But horsepower today is more temperamental.

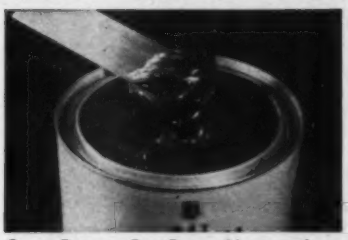
Many factors now enter into the selection of grease: such as types of bearings, bearing clearances, pressures or loads, temperatures, speeds, and the many possible combinations of these. To meet these conditions, there are numerous types and grades of grease, with various oil viscosities, penetration characteristics, and temperature- and water-resistant qualities.

Fitting these many types of grease to the countless jobs requiring grease lubrication in industry is a specialist's work. Standard Oil has such specialists. The Lubrication Engineer in your locality will help you with this problem. He has a wide range of products from which to choose. He's had years of practical experience in applying them.

Why not put your grease lubrication in the hands of the Standard Oil Lubrication Engineer near you? Let him help you start saving horsepower and maintenance *now* for the coming competitive post-war period.

Buy more War Bonds

Cup Grease. Lime soap base, low viscosity oil.



Cup or Pressure Gun Grease. Lime soap base, medium or medium heavy viscosity oil.

Fibre Grease. Soda soap base, medium viscosity oil.

Short-fibre Grease. Soda soap base, medium viscosity oil.

Compound. Usually no soap base, special petroleum stocks.

STANDARD OIL COMPANY (INDIANA)

STANDARD SERVICE

★ LUBRICATION ENGINEERING

Paper Mills in South Africa Use Domestic Raw Materials

Despite the fact that South Africa has no appreciable supplies of timber for paper-pulp, papermaking plants in the Union are at present striving to contribute toward the country's demand. With Scandinavian sources of supply denied her, and British and American sources restricted by the lack of shipping, the supplies of paper available in South Africa fall far below the demand.

The largest mill in the Union manufactures its own pulp from South African raw materials. A considerable amount of wastepaper is collected under a national scheme, and this is distributed to the three mills for reuse in the manufacture of board.

Two smaller mills making a limited range of papers, have now increased their production to a maximum and the one large plant established just before the outbreak of the War is making valiant and successful efforts to make up the country's deficiency.

An intensive wastepaper collection throughout the Union has been operating for many months, and with this reclaim, with additional pulp from South African sources, the mill is making the types of industrial papers and boards most urgently needed.

From one of these mills come the paper used for the production of the composite containers for foodstuffs and other products for which tinplate is no longer available. Other board has gone to make the hundreds of thousands of mortar bomb containers and containers for large aerial bomb tails.

The largest mill also has made the special paper needed for military field maps. Printing papers too are being manufactured and under strict paper rationing schemes whereby every use of paper in South Africa is reduced to an absolute minimal essentiality level, they have contributed largely to the maintenance of the printing industry in South Africa.

The output of the largest mill in the Union is devoted to essential uses. The illustration above shows the wet end of one of the papermaking machines, and below the finished paper coming off the production line

◆

▶▶▶ ERECTION OF a $15,000 medical clinic building is proposed for Powell River, British Columbia. The building will be erected by the Powell River Company, and it is understood it will be built adjacent to the hospital unit built there a short time ago. The new building will provide office facilities for four doctors.

◆

FIRE DAMAGES NO. 2 MILL OF ROBERTSON CO.

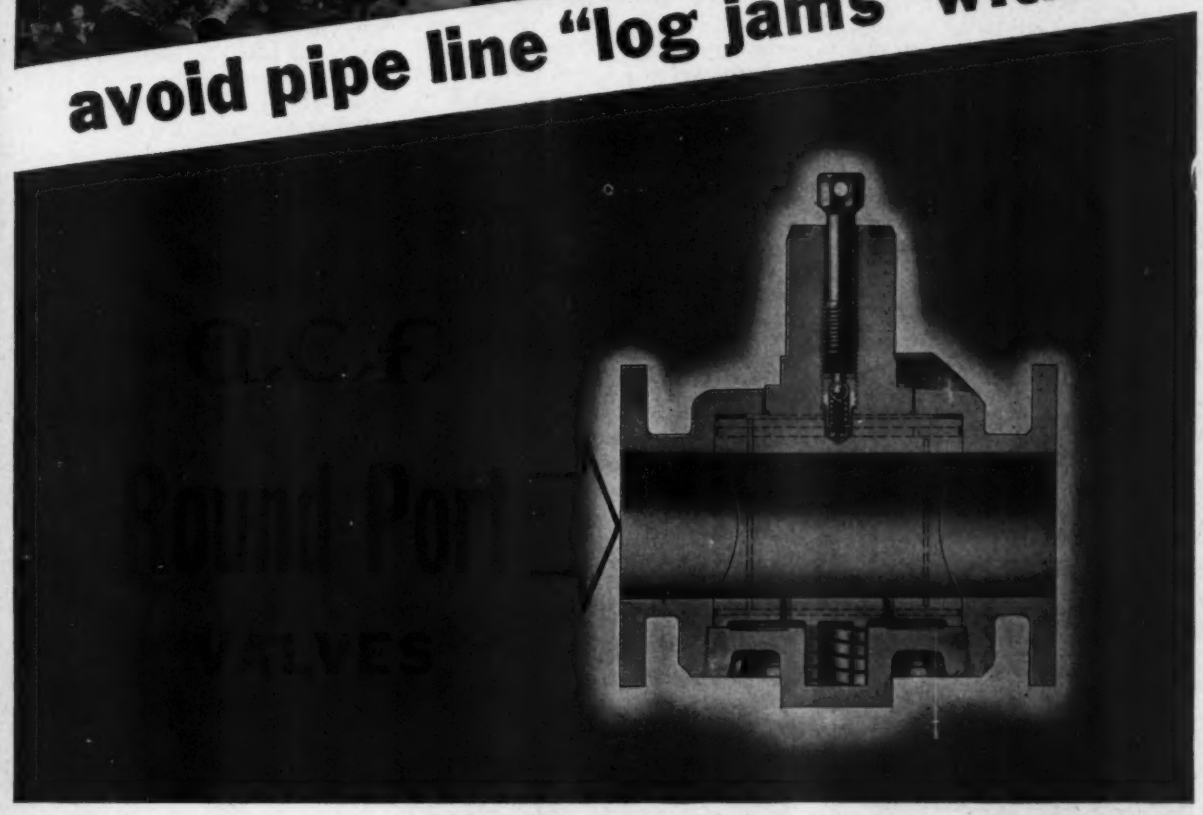
A fire which gutted Mill No. 2 of the Robertson Company, Ashuelot, New Hampshire, resulted in damage estimated at from $75,000 to $100,000.

The walls of the building remain standing and part of the roof remains. Although the inside of the mill was gutted, and the press roll and dryers badly damaged, it is believed that the main paper machine may be salvaged.

The mill was turning out a large percentage of its tissue paper production on government orders and had a large stock of finished tissue on hand.

Clarence B. O'Neal is the owner of the company; he became sole owner last December, when he purchased the interest of his associate, Frank W. Jeffords. The mill was built by E.

avoid pipe line "log jams" with...



full pipe area — straight through plugs

Get rid of pipe line "bottlenecks" *once and for all* with Q.C.f ROUND PORT Full Pipe Area Lubricated Plug Valves! Designed specifically for handling the heaviest, most difficult ladings, the valve when open becomes *an exact continuation of the pipe* — and there can be no velocity, area, direction or cross-section changes of the lading. No abrasive action at the valve — long life.

The Q.C.f ROUND PORT is available in sizes ½" to 8", and is a specialty in the Q.C.f line of full pipe area rectangular port valves. Merely a minimum amount of lubricant is needed when installed and for servicing. In addition, the lubricant acts as a plastic head gasket, hence no auxiliary packing is required. Go-devils, swabs or other cleaning agents that will pass the pipe itself, will pass thru this round port valve. Q.C.f valves may be quickly dismantled and re-assembled. Design problems on both new and replacement work are simplified because the Q.C.f ROUND PORT may be installed *in any position* — and no special tools are needed. Available in wrench, spur, or worm gear types.

Representatives in principal cities carry adequate warehouse stock for quick delivery.

SOLVES LADING PROBLEMS

Tar, sludge, grouting, asphalt, viscose, rayon, nylon, granular solids, paints, paper pulp, pulp while in process, black liquor, white liquor, caustics, acids and similar viscous or waste materials are all handled efficiently. Send for Catalog #3-P.

AMERICAN CAR AND FOUNDRY COMPANY

Valve Department

30 CHURCH STREET, NEW YORK 8, N. Y.

C. Robertson in 1903. Mr. O'Neal announced that rehabilitation of the mill will begin at once. Meanwhile, the employees of the No. 2 mill will be employed in the company's No. 1 and No. 3 mills.

◆

INDUSTRY'S PRODUCTION PER EMPLOYEE SHOWED INCREASE LAST YEAR

With ten per cent fewer employees in the mills the paper and pulp industry is producing more paper than in 1942 according to the American Paper and Pulp Association.

Production per employee increased from 98 tons in 1939 to 117 tons in 1944, the Association said. Average weekly hours of labor have increased from 39.2 to 49.4 and wages paid have jumped from 176 million dollars in 1939 to 329 million dollars in 1944. Labor cost per ton of paper has gone up 50 per cent while prices have risen only 20 per cent within the same period.

This greatly increased efficiency, under very difficult conditions, in an industry essential to the war, reflects the consciousness of the importance of the industry in the minds of both management and employees.

The ratio of United States paper production to mill capacity for the week ending March 3, 1945, as reported by the Association, was 89.3 per cent compared with 89.7 per cent for the preceding week and 87.0 per cent for the corresponding week a year ago. Paperboard production was 96 per cent for the current week compared with 97 per cent for the preceding week and 95 per cent for the corresponding week a year ago. (*From release issued by American Paper and Pulp Association.*)

◆

A CAMPAIGN TO EFFECT MORE CAREFUL SHIPPING

A movement designated as the 1945 Shipping Campaign is being conducted during the month of April. Its purpose is the reduction of damage and loss to goods in transit, which last year amounted to an estimated $60,000,000.

Because of the need for national economy, this was considered a heavy loss and a great drag on our war effort, due to the fact that a large portion of the goods damaged or destroyed was war material.

Looking ahead to the time when old trade channels will be restored and new markets opened, J. E. Bryan, general chairman of the National Management Committee, stresses preparedness. When buying returns to normalcy, buyers will choose products that reach them in good condition. All of which means, care in shipping.

◆

▶▶▶ A POLLUTION CONTROL commission has been set up for the State of Washington and the bill which was passed by the state legislature has now been signed by the Governor. The commission will have jurisdiction to control and prevent the pollution of bodies of water in the state, with authority to enforce its rules. It is the opinion of pulp and paper mill executives of the State that the bill offers no obstacles which cannot be surmounted by pulp and paper plants.

◆

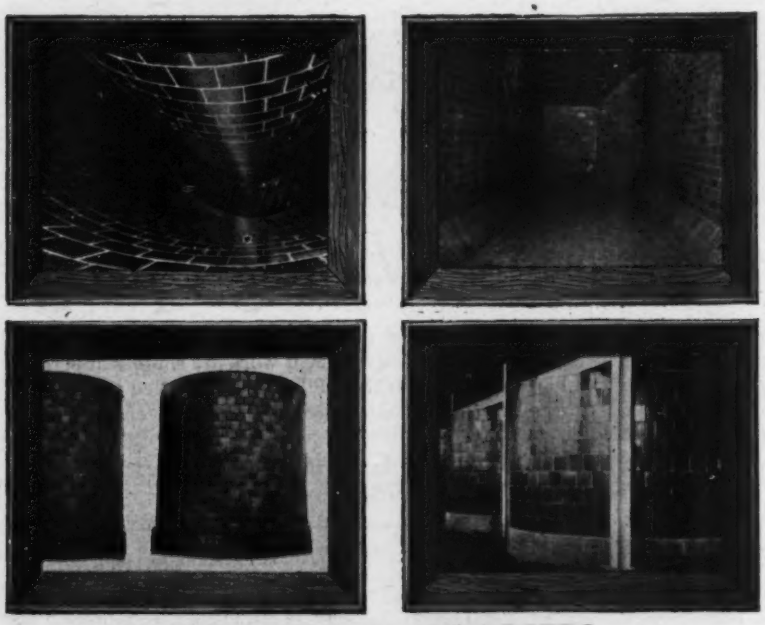
▶▶▶ A BILL in the Quebec Legislature resulted in extending to July, 1947, the powers of the Government to effect a reorganization of the Quebec Pulp and Paper Company. During the debate over the bill, Premier Duplessis informed the Legislative Assembly that he had been successful in negotiating with Consolidated Paper Company and Price Bros. & Company that they waive their holdings of the common stock of Quebec Pulp and Paper in favor of the Province. It is hoped this step will facilitate the reorganization of the last named company, now in bankruptcy because of an unpaid claim of over a million dollars to the Quebec Streams Commission.

◆

▶▶▶ THE FIRST OF THE YEAR Sweden had on hand stocks of 403,000 metric tons of sulphite and 264,000 tons of sulphate pulp, both figures being dry weight. This information, released through the American Paper and Pulp Association, states that Swedish mills operated in December at 48 per cent of capacity.

◆

▶▶▶ A NATIONAL ADVERTISING campaign has been announced by the Ecusta Paper Corporation, Pisgah Forest, North Carolina. This campaign will feature the company's new, lightweight, air mail paper and executive letter paper made from virgin flax fiber. This campaign has been launched with the hope that it will provide effective co-operation in the government-sponsored campaign for the use of lighter weight papers for all correspondence.



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One source of supply for all pulp and paper mill linings. Our business is exclusively devoted to linings and tile tanks. Consult Stebbins on your next lining or tank job.

SEMCO

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WHAT HAVE YOU THAT'S CORRODING?
Pickling and heat treating crates, baskets, and accessories of corrosion resisting metals.
Tanks, kettles, agitators, and miscellaneous processing equipment which resist corrosion.
Monel, Inconel, Cupro Nickel, Stainless Steel, Alloy Steel, and common steel TUBING from 3" IPS or 3½" OD on up. wall thickness .065 to 1".
Fittings . . . mitered type, long and short radius ells, tees, crosses, reducers, laterals and returns in all types, sizes and thicknesses.
ARMY E NAVY

here's what WELDCO can do for you!

When corrosion causes failure of metal parts and equipment, thus creating shutdowns thereby increasing maintenance costs . . . and also where contamination caused by deterioration of metals institutes production holdups . . . then you have a good problem for Weldco Engineers.

Thirty-three years of field experience have taught the Weldco engineering department what metal will best defeat your combined corrosion and production problems. Large plant facilities enable The Youngstown Welding & Engineering Company to build what you need. Hence, you will find it well worth your while to let Weldco specialists recommend a practical design and the proper choice of Monel, Inconel, Nickel, Stainless Steel, or other corrosion resisting metals for your specific requirements.

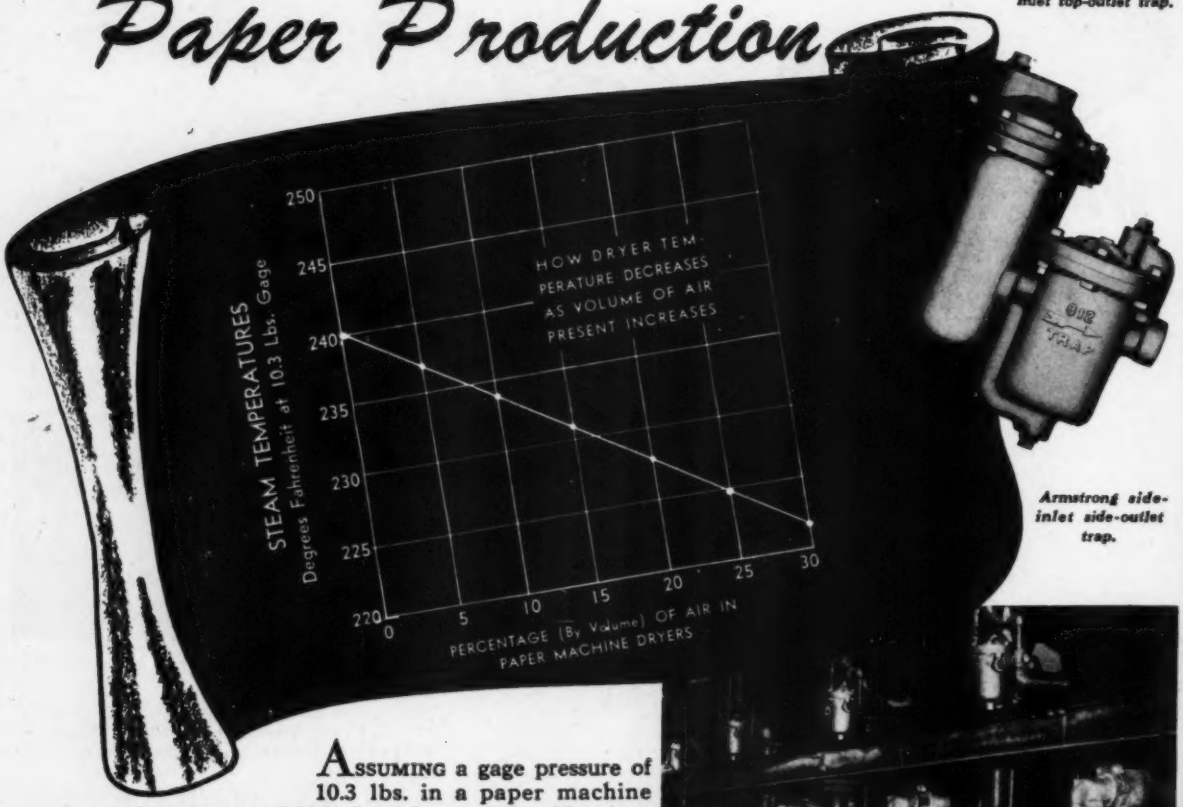
WRITE FOR LITERATURE

Weldco folders are available on (1) tubing and fittings, (2) chain, (3) pickling and heat treating crates and baskets, (4) steam jets . . . all of corrosion resisting metals. Write for any of this engineering-style literature or ask for details on corrosion resisting tanks, kettles, agitators, and miscellaneous rolls.

THE YOUNGSTOWN WELDING & ENGINEERING CO.
3752 OAKWOOD AVE. YOUNGSTOWN 9, OHIO

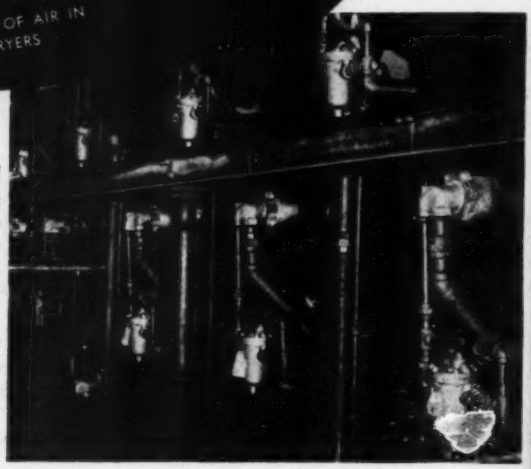
WELDCO *Specialists in Corrosion Resistance*

. . . how air in dryers reduces *Paper Production*



Armstrong bottom-inlet top-outlet trap.

Armstrong side-inlet side-outlet trap.



ASSUMING a gage pressure of 10.3 lbs. in a paper machine dryer, the presence of 20% by volume of air will reduce the steam temperature to 228° F., which is *12.1° below true steam temperature.* Higher percentages of air reduce temperatures correspondingly. The effect on paper production of sub-normal dryer temperatures is obvious.

Accumulation of an excessive amount of air in a dryer is generally the result of inadequate drainage of condensate which permits the syphon pipe to become water sealed thereby closing it off to the passage of air.

Armstrong Inverted Bucket Steam Traps designed specially for paper mill service eliminate this difficulty and assure you maximum temperatures by:

1. Drainage of condensate as fast as it collects, thus permitting free passage of air from the dryer.
2. Automatic venting of *all* the air drawn from the drying cylinder.

For a comprehensive, educational and easy-to-read study of this subject write for a copy of "OBSERVATIONS ON DRYER DRAINAGE SYSTEMS" by Paul L. Ulrich.

***CHECK YOUR DRYER TEMPERATURES!** If below true steam temperature, your drainage system is inadequate. For complete details, write today.*

HIGHLIGHTS
Armstrong Drainage

1. Drains condensate as fast as it accumulates.
2. High Air venting capacity.
3. No steam waste.
4. Low maintenance.
5. Maintains uniform temperatures, uniform drying.
6. Quickly responsive to load changes.
7. Permits operation of groups of dryers at different temperatures.
8. Reasonable first cost — an investment that pays high returns.

ARMSTRONG MACHINE WORKS
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ARMSTRONG *Inverted Bucket* STEAM TRAPS

1945

STOP

PRODUCTION ROBBING CORROSION

By using Timken Seamless 5% Nickel Steel Tubes In Your Black Liquor Evaporators

Many paper mill operators are reducing production robbing downtime by using Timken Seamless Tubes of 5% Nickel Steel in place of carbon steel in Black Liquor Evaporators.

The extra life provided by Timken Nickel Steel Tubes keep evaporators in service for longer periods of time and reduce wear and tear on headers. Important qualities that make substantial savings possible and help mill operators meet vital production schedules.

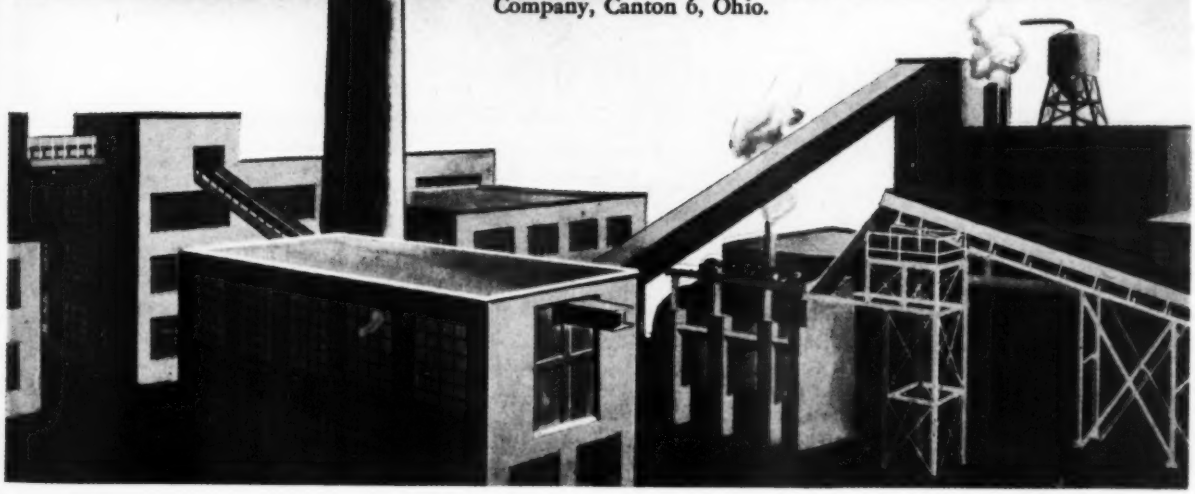
In addition to 5% Nickel Steel Tubes, some mill operators use Timken Stainless Steel Tubes. These are used in concentrated effects where maximum protection is demanded to combat severe and unusual operating conditions.

Before you make replacements or plan new construction investigate the advantages of Timken Seamless Tubes. A member of our technical staff will be glad to make recommendations or, a request written on your firm's letterhead will bring data on Timken Seamless Tubes of 5% Nickel Steel. Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE MARK REG. U. S. PAT. OFF.

SEAMLESS STEEL TUBES



SIGNAL CORPS PHOTO

Death for the Enemy —packed in PAPER

Out of its paper jacket—into the waiting barrel of a giant gun—then roaring on its way into the enemy lines. Up to the very moment of its mission of death, each shell is packed and protected in paper. Shell cases are made of paper board. Bullets and hand grenades are packed in paper cartons.

Today *paper* is a vitally essential war material—serving in countless ways at home, in industry and at the battle fronts. The paper industry, meeting the emergency with resourcefulness and skill, is making an enormous contribution to carrying the war to a victorious conclusion.

KENWOOD WOOL PRODUCTS

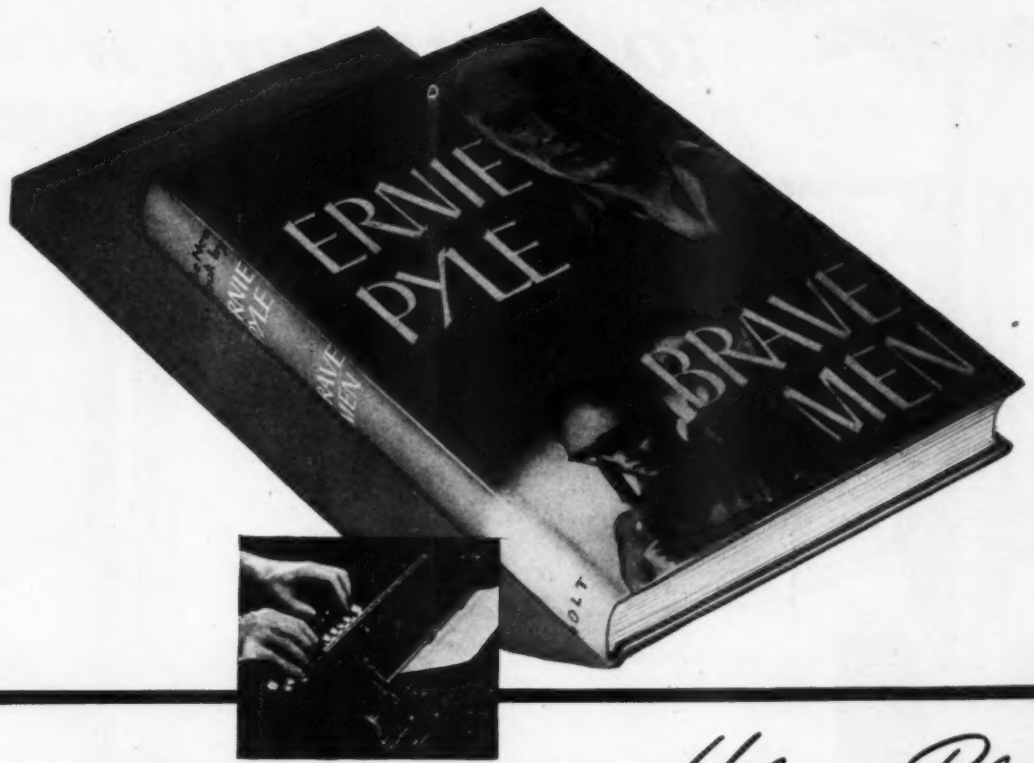
F. C. Huyck & Sons is proud to be serving an industry so essential to the war program. Our skill, our facilities and our 75 years of experience are always available in solving the special felt problems created by urgent wartime paper needs.

F. C. HUYCK & SONS

Kenwood Mills

Albany New York

THE BEST SELLER STARTS ON WHITE PAPER...



...AND WHITENESS STARTS WITH *Helmerco Blue!*

Today's white bond, writing, book and ledger papers possess a high whiteness of shade that yesterday's papers never knew, when they're tinted to a pure white perfection with Helmerco Blues.

Helmerco Blues have excellent working properties in any furnish. Added directly to the beater, they disperse immediately, giving a broad range of white shades having good light fastness and excellent brightness. Helmerco Blues give white papers premium quality whiteness, at a minimum color cost. Fine light blues in the same group of papers can also be produced with Helmerco Blues.

H & M Technical Service Department is always ready to cooperate with you in developing special dyes for specific paper problems, or in supplying desired information on the correct usage of H & M colors.

RANGE OF HELMERCO BLUE SHADES FROM RED TO GREEN

M 4 R Conc.	2 G B Conc.
M 2 R W Conc.	M 2 G Conc.
M G W Conc.	M 4 G Conc.
M G Conc.	M 5 G

COLORS BY CALCO

Heller & Merz Department

CALCO CHEMICAL DIVISION • AMERICAN CYANAMID COMPANY

Bound Brook, New Jersey

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Maintenance time reduced to a minimum

Every day, Powell Valves are piling up records for continuous operation without requiring maintenance. And when they finally need attention, Powell design and construction is such that the time spent in maintenance is reduced to a minimum. The gate valves shown here are examples of the complete Powell Line in which ease of maintenance is always a feature.

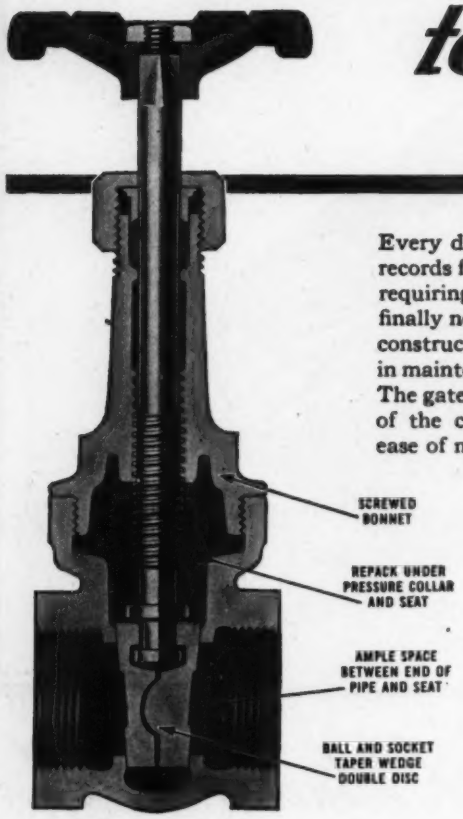
SCREWED BONNET
REPACK UNDER PRESSURE COLLAR AND SEAT
AMPLE SPACE BETWEEN END OF PIPE AND SEAT
BALL AND SOCKET TAPER WEDGE DOUBLE DISC

Fig. 500
BRONZE "U. S." GATE VALVE

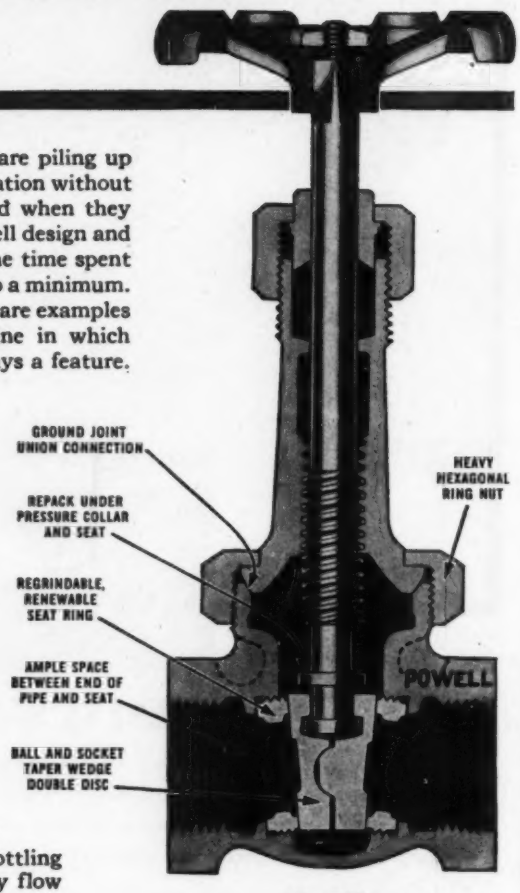
GROUND JOINT UNION CONNECTION
HEAVY HEXAGONAL RING NUT
REPACK UNDER PRESSURE COLLAR AND SEAT
REGRINDABLE, RENEWABLE SEAT RING
AMPLE SPACE BETWEEN END OF PIPE AND SEAT
BALL AND SOCKET TAPER WEDGE DOUBLE DISC
POWELL

Fig. 1375
BRONZE "WHITE STAR" GATE VALVE

In all installations where pressure drop is undesirable and throttling is unnecessary, the gate type of valve, with its full straightway flow area through the body, should be used.

Fig. 500 is Powell's answer to the widespread demand for a sturdy small bronze gate valve where initial cost is a consideration. With its readily removable screwed-in bonnet it is easy to reface the seats and disc or replace the disc if necessary. The taper wedge double disc, with its Powell-designed ball and socket action, readily adjusts itself to any inclination of the seat faces caused by refacing, thus effecting a tight closure. Since the seats are cast integral with the body, this valve will give dependable service as long as sufficient metal remains in the seats to permit refacing.

For *extra long life*, Fig. 1375 is recommended. The ground joint union connection makes it especially easy to remove the bonnet assembly from the body to reface or, if necessary, to replace the disc and renewable seats. This may be done any number of times without any distortion of the body neck, such as might occur with a screwed-in bonnet. Both disc and seats are made from a special hard nickel-bronze alloy which resists wear over a long period of time. When these parts will not take further refacing, they can be readily replaced with new ones, thus greatly prolonging the life of this valve.

All Powell Valves that require repacking are provided with a specially machined cut-off to permit repacking under pressure when wide open.

The Wm. Powell Co.
Dependable Valves Since 1846
Cincinnati 22, Ohio

POWELL VALVES

PAREZ NEW WET AND DRY STRENGTH QUALITIES

BRIDGE THE GAP TO NEW FIELDS OF USEFULNESS FOR PAPER

When PAREZ** 607 is converted into the Cyanamid-developed active colloid for incorporation into paper, it helps paper bridge the gap between its own qualities and those of other materials. Wet or dry, paper treated with PAREZ, Cyanamid's new melamine paper resin, is stronger and tougher... has improved tensile and bursting strength ... plus folding endurance and improved printability due to lack of waviness and curl.

There is also an important cost advantage. Paper may bear a higher ratio of value to cost than it would if it lacked the PAREZ wet strength features. Possibilities of profit on articles for which paper has long been the established material are thus improved because more value is built into them.

PAREZ 607 for wet strength papers helps produce extraordinary "above-the-line-of-duty" paper products, meeting super-specifications for military demands.

The war-proved applications for improved wet and dry strength papers made possible with PAREZ, point the way to new consumer and industrial peacetime product uses. Full details on the many advantages imparted to paper by PAREZ are available from Cyanamid.

**Trade-mark of American Cyanamid & Chemical Corporation covering its synthetic resins for use by the paper industry. The processes under which PAREZ is applied in the production of wet strength paper are covered by U. S. Patents Nos. 2,291,079, 2,291,080, and 2,345,543, and U. S. Patent Application Serial No. 453,032.

Waxes • Wax Sizes • Rosin Size • Synthetic Resins • Casein • Alum • Sulphonated Oils • Fillers • Defoamers Soda Ash • Caustic Soda • Salt Cake Acids • Clays • Satin White • Aerosol* Wetting Agents • Calmicro (Calcium Carbonate) and other Paper Chemicals

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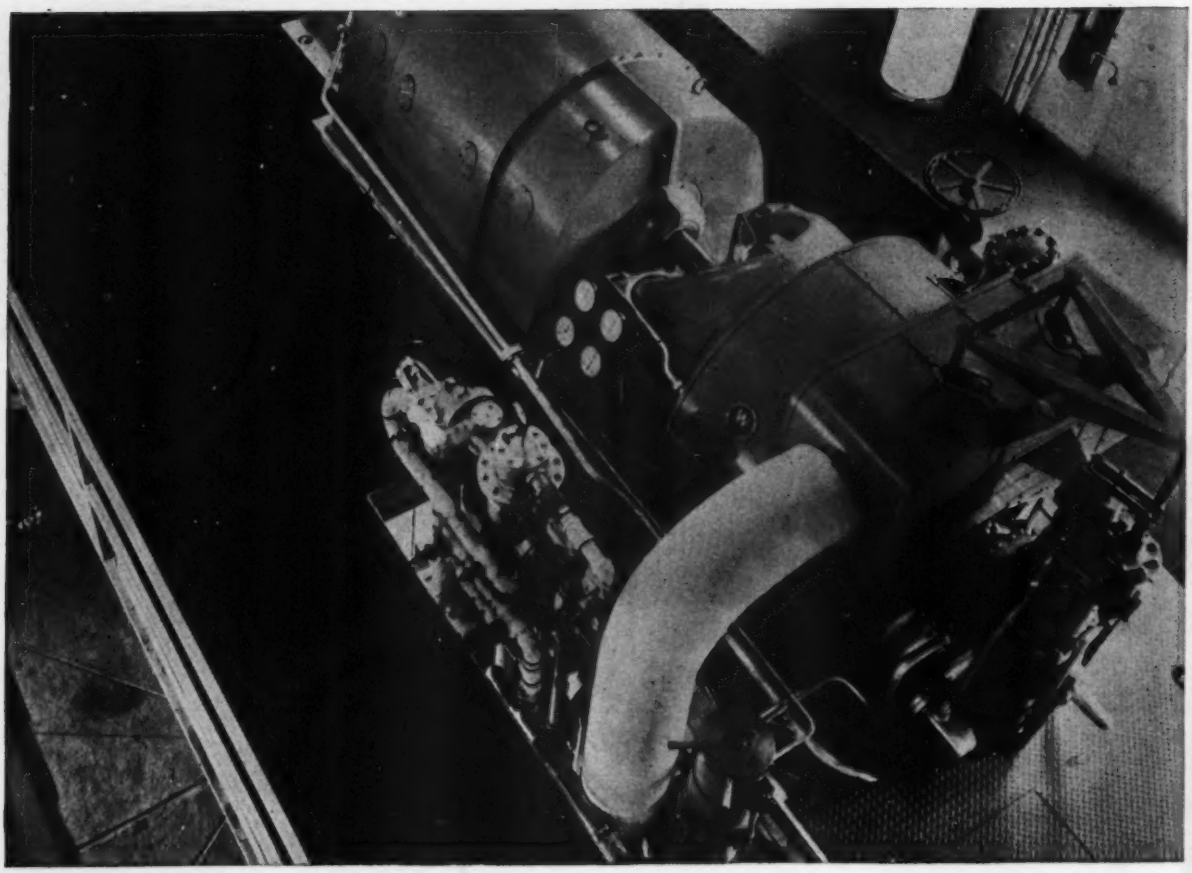
DISTRICT OFFICES: Boston, Mass.; Philadelphia, Pa.; Baltimore, Md.; Charlotte, N. C.; Cleveland, Ohio; Chicago, Ill.; Kalamazoo, Mich.; Detroit, Mich.; St. Louis, Mo.; Azusa, Calif.; Seattle, Wash. *In Canada:* Dillons Chemical Company, Ltd., Montreal and Toronto



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ELECTRICITY is the mainspring of industry—the driving force for 90% of America's productive machinery. To meet unprecendented demands, output of public utility generating plants alone has been boosted to more than 231,000,000,000 kilowatt-hours annually.

In both steam and hydro turbines, effective lubrication is essential to dependable, trouble-free operation. In the experience of plant operators everywhere, this is best assured with lubricants specially designed for turbine use . . . *Texaco* lubricants, available for every type of turbine.

Texaco Regal Oils (R & O) for example, are scientifically designed to prevent rusting of turbine lubricating systems. They are highly resistant to oxidation, foaming, sludging and gum formation. Because of these qualities, *Texaco Regal Oils (R & O)* keep turbine systems clean, bearing temperatures normal, governor action smooth and sensitive. They fully meet specifications of all leading turbine builders and the turbine oil specifications of the U. S. Navy.

Texaco lubricants have proved so effective in service they are definitely preferred in many fields, a few of which are listed at the right.

For suggestions on the proper care of oil and maintenance of turbine systems call on Texaco Lubrication Engineering Service, available through more than 2300 Texaco distributing plants in the 48 States. The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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★ *More revenue airline miles in the U. S. are flown with Texaco than with any other brand.*

★ *More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.*

★ *More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.*

★ *More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.*

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TEXACO

TEXACO Regal Oils (R&O)

FOR ALL TURBINES

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON EVERY SUNDAY NIGHT — CBS

1882— Franklin Delano Roosevelt *—1945*

An American who was the thirty-first man to become President of the United States passed away April 12 at the age of sixty-three years. Franklin Delano Roosevelt became President in 1933, and was the Nation's Chief Executive longer than any former president.

With the crucial period of the greatest war of all time at hand and Victory in sight, the Nation mourns the passing of its leader who lived and worked for the peace of the world. For him, history has been repeated—many great leaders have not lived to see the result of their labors or the fulfillment of their cherished plans.

Eighty years ago (April 15, 1865) the Nation mourned the loss of Abraham Lincoln, its wartime President. The causes to which he devoted himself have become strong pillars of the national structure.

President Roosevelt had envisioned the time when all nations of the earth would be united by an everlasting bond of peace, and his courageous and untiring efforts for the good of humanity will live on through generations after Victory.

The late President will stand among the great leaders of history who could *"walk with kings, nor lose the common touch."*

.....Editorial.....

The Paper Industry Status

▶▶▶ SOME INTERESTING facts regarding the status of the paper industry are at hand from which some illuminating conclusions may be drawn. For instance, the number of paper concerns producing paper and pulp are declining:

In 1941, there were 535 concerns; in 1945, there are 522—a decline of 13.

In 1942, the all-time peak, there were 746 mills; in 1945, there are 723—a decline of 23.

In 1942, there were 98 groundwood mills; in 1945, there are 89—a decline of 9.

In 1942, there were 75 sulphite mills; in 1945, there are 69—a decline of 6.

In 1940, there were 43 sulphate mills; in 1945, there are 52—a gain of 9.

The latter is the only classification in which a gain is shown.

However, the over-all production of paper remains static as the following figures show:

In 1940, the over-all production of all grades was 14,483,709 tons, or 86 per cent of capacity.

In 1941, it jumped to 17,272,914 tons, or 97 per cent of capacity.

In 1942, the total production was 17,083,862 tons; in 1943, it was 17,035,688 tons; and in 1944, it was 17,182,888 tons. The average for the four years is 17,143,838 tons which represents capacity production operations.

For the four years, 1941 to 1944 inclusive, when the industry moved up to capacity operations and continued to operate at capacity in face of tremendous handicaps, the record of performance in behalf of the war and civil economies, is certainly a notable one.

The paper industry produced its limit of capacity and that, in face of a decline in paper concerns and mills; in spite of the fact that the War Production Board erred grievously in taking the pulpwood cutters into the Armed Forces; in spite of the shortage of labor, rising costs, shortage of essential parts and repairs; and finally, in spite of floods, transportation and tie-ups, and red tape. In the face of these paralyzing factors, the industry came through and delivered its maximum.

But what of the future? Where do we go from here?

The paper industry is facing a pent-up demand for its products which is truly terrifying. Is it possible to estimate it? We think so. Paper is the necessary essential commodity and instant concomitant to all industrial activity. The greater the activity, the greater increase in paper consumption.

In 1940, when the consumption of paper in this country aggregated 16,732,341 tons, the Federal Reserve Bank Index number of industrial activity averaged 125. For the month of January, 1945, the Federal Index number was 230, indicating a potential over-all paper consumption of 30,787,800 tons. So, the problem simplifies itself into this sort of a theorem: How can a maximum over-all production of paper of 17,143,838 tons satisfy potential consumption demand for 30,787,800 tons?

Keep in mind that we are only seeking a basis for estimating the probable ratio of demand to supply in these times when the operation of the natural law of demand and supply is being artificially controlled.

It is most difficult and confusing to all concerned to get anything like a rational picture of the situation unless we have some sort of a basis yardstick to help us set the problem.

The Federal Reserve Bank Index number, we believe, is particularly applicable to the paper operation for it is the best index we know of, carefully and scientifically compiled to give the trend of industrial activity throughout the country. And, as paper is so intimately related and sensitive to every change in activity, the changes in the consumptive demand of paper tonnages would naturally follow.

In October, 1944, the Federal Index number reached what we believe is the all-time high for this war—viz. 249, which, by the way, happened to be the high reached by Fisher's Index number in July, 1920, as this writer recalls.

The decline in industrial activity has set in and by January, 1945, it was 230. It will continue to sink. How far it will decline, nobody knows. But, we give it as our opinion, that even a couple of million tons of Swedish pulp, if it is possible to import it to this country within the next year, will not in any way affect the then heavy excess of consumptive demand for paper to such an extent that civil consumers will have sufficient paper to even partially supply their needs.

With the cessation of destruction by European hostilities this year, the activity of the reconstruction will in all probability exceed the activity of the destruction era for a long time.

These are interesting facts that the operators of paper concerns will find to be exceedingly illuminative, the more they are noted and studied.

Current Thought

To Win Wars You Have to Kill People

WILLIAM SIBLEY

▶▶▶ THERE IS NOTHING sadistic in that title. It is merely a statement of fact. However, it is a relatively new fact and, therefore, unrealized by many. Prior to the present conflict, winning wars was a matter of killing soldiers. Now we not only have to kill soldiers but kill *people*, too.

Wars are not what they used to be. In the "good old days" the overlord who owned a parcel of land (something approximating a township, perhaps) might look with envious eyes on his neighbor's property. So, he would mobilize his erstwhile farmhands, put them in armor, give them spears or bows and arrows and send them forth to conquer. It was all a "glorious" business. If the campaign was successful, the lord took the adjacent conquered property and divided it among the farmer-soldiers as their reward. One can still see in Brittany the earthenwork walls dividing conquered property of the old feudal system.

During later years, when we learned how to use the Chinese invention of gunpowder, war became a somewhat more serious business. It lost much of its glamour; it became more dirty and destructive. The similarity between the bow-and-arrow and the gunfire warfare that remained was this: For the most part the wars were fought out by the soldiers themselves. It was men against men; regiment against regiment. They had no Red Cross. The U.S.O., Y.M.C.A., Jewish Welfare, or Salvation Army, were yet to be thought of as a means for auxiliary help to the soldiers. In earlier wars, the men took care of themselves for the greater part. They appropriated their own food as they progressed; they nursed each other; they took prisoners and stored them in stockades or prison camps until the war was over. Not infrequently prisoners were exchanged so that the fight could be continued. That practice always seemed to me to be a bit silly, but that's the sort of war code which became established.

With the advance of the mechanical means for making war—guns which throw things with deadly accuracy even when the enemy is far out of sight . . . airplanes which can drop eleven tons of TNT on the enemy from a height of five miles . . . robot bombs which travel faster than sound and so cannot be percepted or intercepted—these are the developments which make it necessary for an entire nation to go to war, not just a few million soldiers. These are the things which make the basements of churches or the assembly halls of schools as much arsenals of war as the factory which makes the TNT or fashions the cannon and superfortress. Thus wars today are not clashes of soldiers. They have become a struggle of entire peoples—and so, to win wars *you have to kill people*. Aged men and 4-Fs, mothers, sisters, sweethearts—*all* are part and parcel of present day war—*all* have on their hands the stain of killed enemy soldiers. Being Americans, we still cling to outmoded "international codes" designed to make war more "humane." But war is no longer humane. War is a business of killing, and the more of the enemy we kill the shorter will be the war and the fewer of us will be killed.

Just why, in the name of warfare, we should have transported tens of thousands of German prisoners to this country, merely to coop them up in prison camps where they can contribute to our shortening food rations, is more than I can see. Our liberal transportation to this country, our coddling and care for the duration, will not make a single friend for the United States. Every one of them will return to broken Germany, swearing eternal vengeance.

And if we put the shoe on the other foot, we have to admit that what the Japs or the Nazis do with American prisoners is their business. Certainly, if American boys now in prison were to be released, practically every one of them would wish to get back into the fight just to "get even."

There is only one reason why we should be mad at Mussolini jumping on Ethiopia, or for the Japs to pull a surprise Pearl Harbor. That single reason is that we are still living in the age of "international code" and nowadays there just ain't no such thing.

After Germany is completely defeated, war correspondents, radio commentators, columnsts and editorial writers will pour into our minds enough bunk about the poor German civilians to make us want to apologize for having won the war. People in a position to make their voices heard will advocate a soft peace.

We should realize right now—and keep it constantly before us—that such advocacy is treason. A soft peace after this war is merely the first heavy contribution to World War III, which will certainly throw the world back into the Dark Ages.

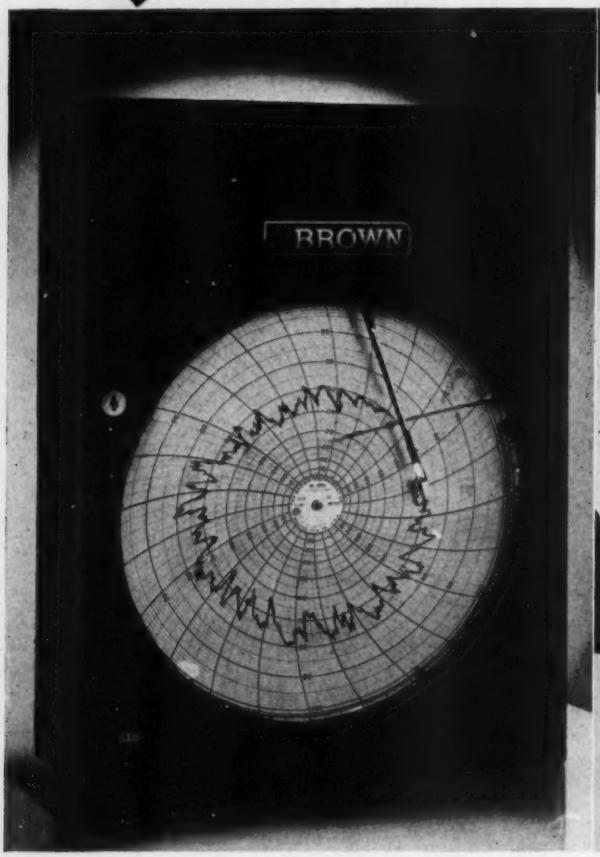
Waste no tears on the German mothers, the German children, the German babies, or the cute little Japs who seem to be hungry and emaciated. The way to win wars is to kill people. Every single unit of the German or the Japanese people is as much at fault for killing American boys and girls as the war lords, or the strutting uniforms . . . What did they think their war lords were shouting while they marched over Belgium or China —football signals?

B. F. PERKINS & SON, Inc.

HOLYOKE, MASS., U.S.A.

LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

INTERCHANGEABLE



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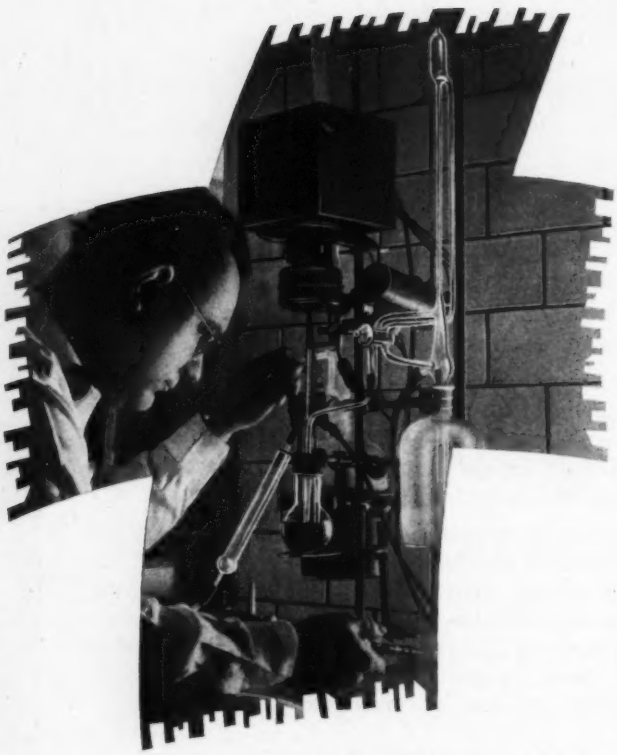
plus value in plasticizer research



Monsanto research in plasticizers has a specific aim today . . . to serve industries whose products help bring victory nearer. Sometimes this research . . . which goes on constantly . . . develops plasticizers for special needs. At other times, it finds ways to replace critical materials with those that are available.

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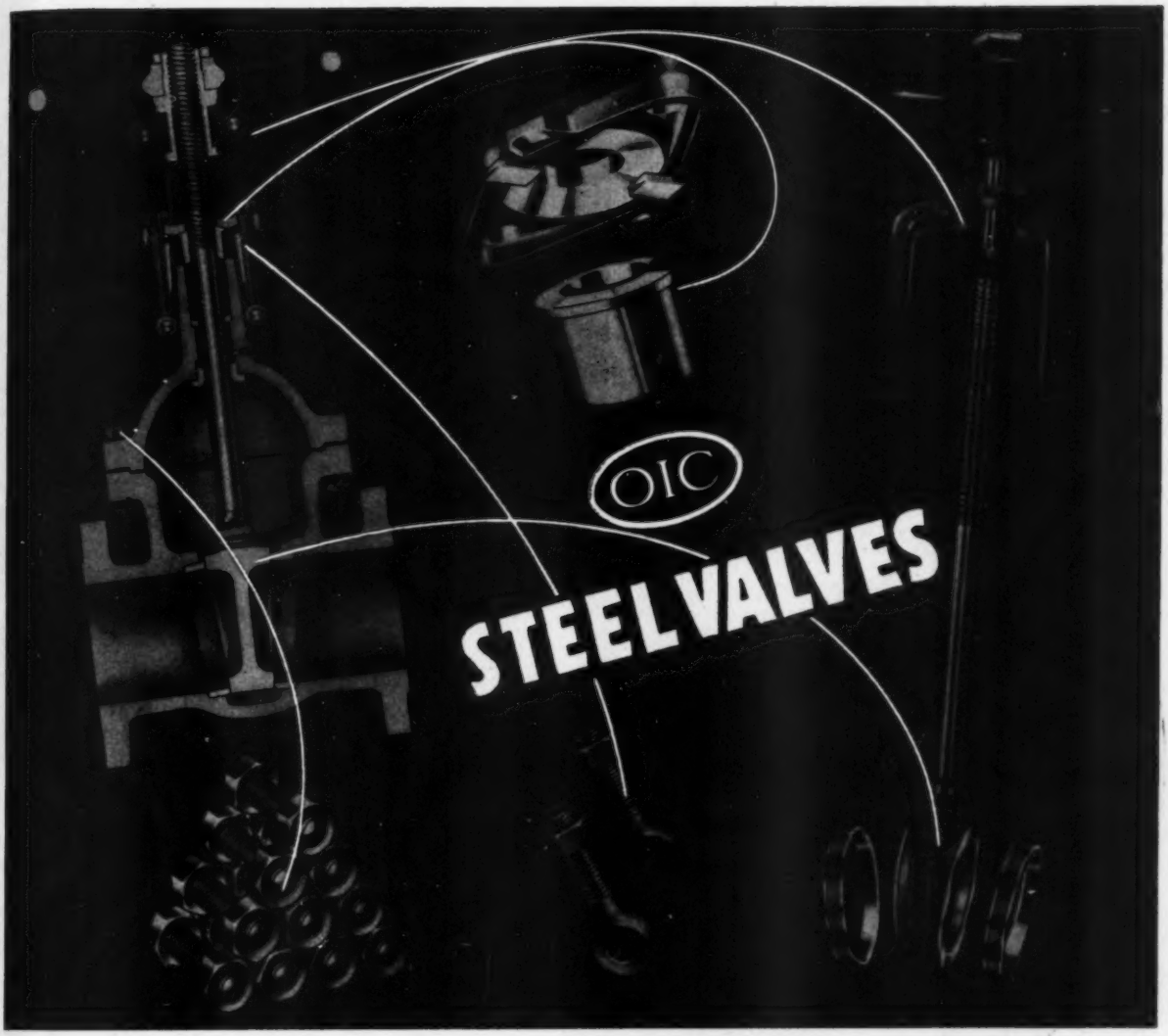

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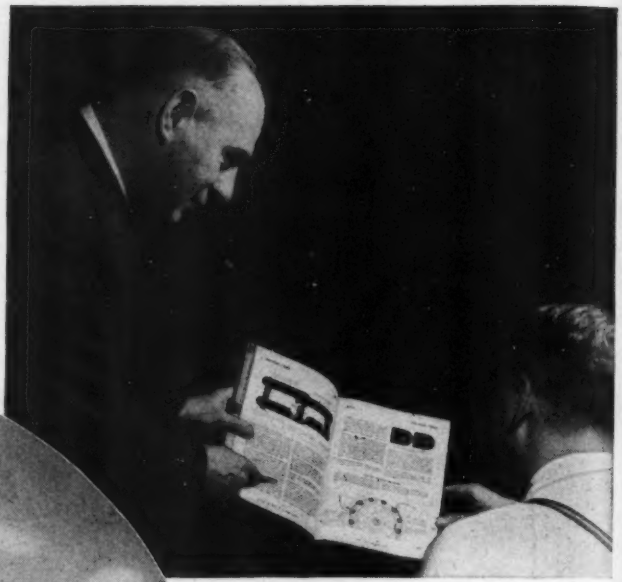
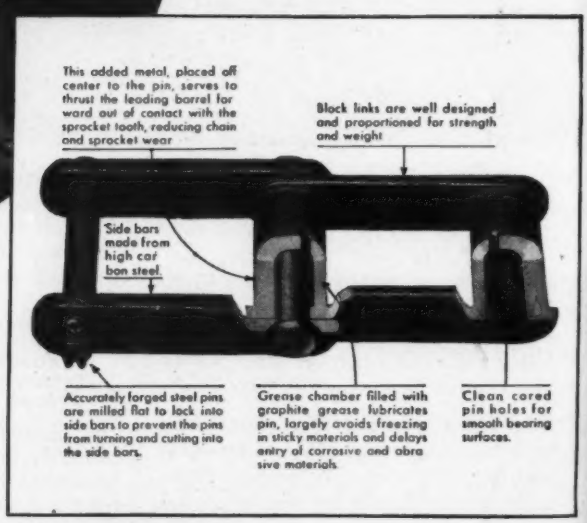
Quality Leaders in Valve Manufacture Since 1883

THIS CHAIN STOPS TEETH FROM *GRINDING!*



① YOU GET LONGER LIFE... more efficient service on transfer and pulpwood conveyors . . . with Rex Durobar chain. For only Durobar has the famous eccentric barrel construction that eliminates grinding between leading barrels of the block link and sprocket teeth.

② DUROBAR is noted for its durability. On pulp log conveyors, such as this, it takes a terrific pounding, but it's more than equal to the task. Block links are made in malleable iron and connecting side bars are blanked from high carbon steel. Where even greater strength and resistance to abrasion are needed, Durobar block links are furnished in Z-Metal, the ferrous metal that is 25% stronger than standard malleable iron.


This added metal, placed off center to the pin, serves to thrust the leading barrel forward out of contact with the sprocket tooth, reducing chain and sprocket wear
Block links are well designed and proportioned for strength and weight
Side bars made from high carbon steel
Accurately forged steel pins are milled flat to lock into side bars to prevent the pins from turning and cutting into the side bars.
Grease chamber filled with graphite grease lubricates pin, largely avoids freezing in sticky materials and delays entry of corrosive and abrasive materials
Clean cored pin holes for smooth bearing surfaces.

③ THIS CROSS SECTION shows where Durobar gets that extra strength. Notice how the barrels are reinforced on the block links. This eccentric construction keeps the leading barrel of the block link out of contact with the sprocket tooth and eliminates grinding action between them as the chain flexes over the sprocket. This exclusive construction assures longer life for both chain and sprocket.

Rex Durobar chain belts, in malleable or Z-Metal, are the answer to many pulp handling problems involving heavy loads and severe service. The Rex Man will gladly help with your chain belt application problems. For engineering information, write for your copy of the 768 page catalog No. 444. Address Chain Belt Company, 1714 West Bruce Street, Milwaukee 4, Wisconsin.

REX CHAIN BELTS

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Resin Simplifies
Army Map Paper Production

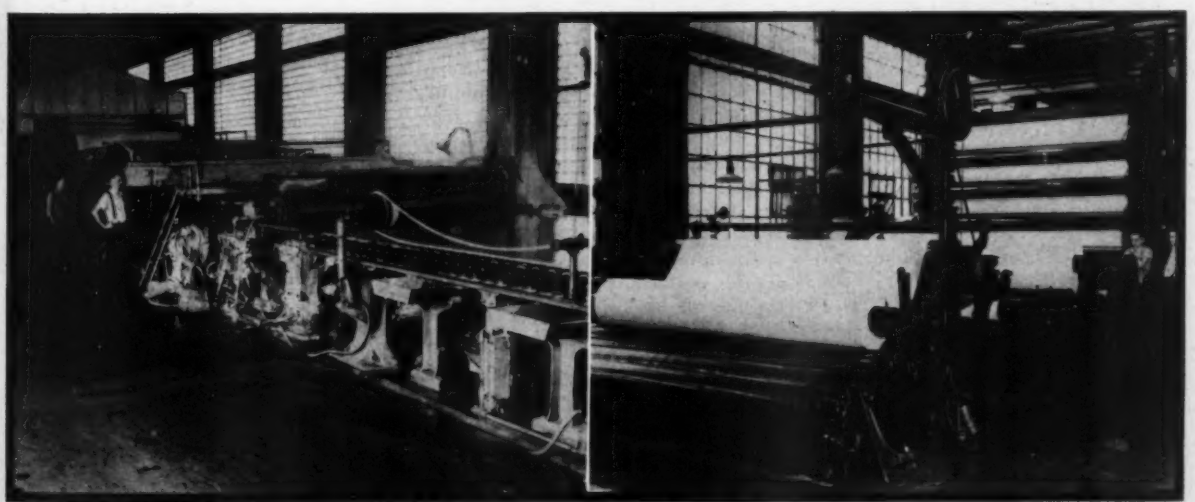
ROBERT P. GOODALE
Resinous Products & Chemical Company

▶▶▶ THE STAGGERING TOTAL of 125,000 military maps went into the June, 1944, attack on the Normandy beaches. Trench warfare had no place in this assault, and each soldier became a swift-moving individual combat unit. In highly mobile warfare, each man must know the exact location of food and ammunition depots, enemy positions and every ditch, bridge, gulley and road junction of the terrain. For combat troops, possession of a military map becomes as important as a hand grenade or rifle.

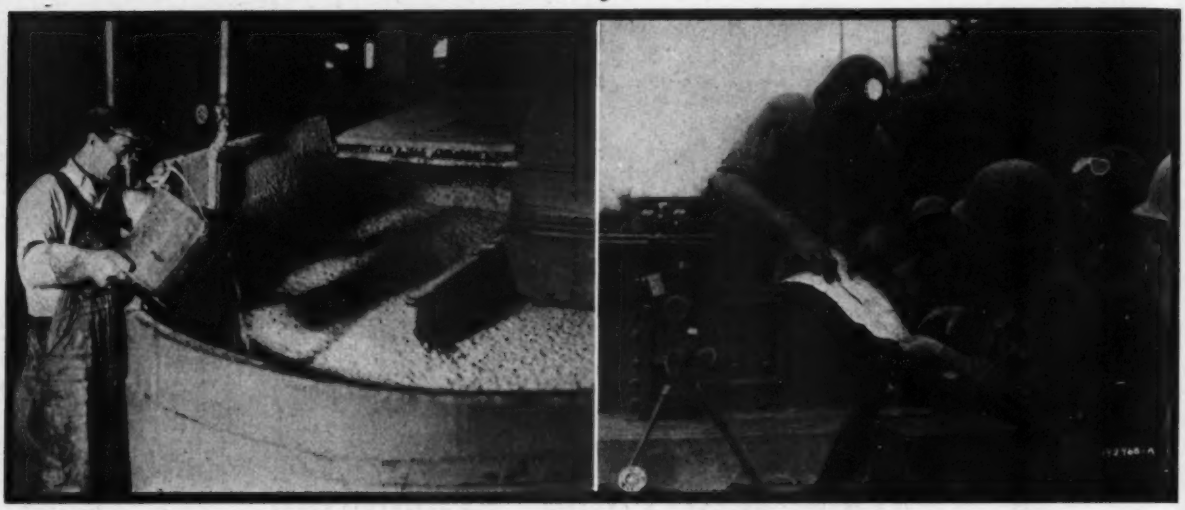
Inch by inch the Normandy terrain was photographed by reconnaissance planes in the month preceding the invasion. Squadrons of P-38's and Spitfires carrying six-inch and 24-inch cameras on the side and bottom of their fuselages were flown by pilots trained for eight months in special navigation and instrument flying. Without so much as a pop gun for defense, they photographed enemy territory in solo missions at 40,000 feet and in good weather they mapped as much as 16,000 square miles at one clip.

When the pilots returned, their photos were rushed to the laboratories for co-ordination, interpretation and analysis. After that, the multiplex machine corrected tips and tilts produced by the wide angle lens of the aerial camera. And finally, these maps were inspected and co-ordinated with Army intelligence ground information.

Armed with these maps, each soldier could not be lost in enemy territory or miss his military objective. It was realized that these maps must withstand all hazards of weather, jungle humidity, soaking during land operations and continued folding and general GI abuse. To meet these service requirements the Army established



Wet end and dry end of fourdrinier machine upon which map paper is produced



LEFT—Adding resin solution to the pulp stock in the beater. Because of its affinity for cellulose, this liquid resin may be added directly to the stock and requires no change in normal paper processing. . . . RIGHT—Army scout uses topographical map to point out enemy strong points to combat team. (Signal Corps photo)

specifications for the manufacture of map paper which imposed rigid standards of quality.

Some indication of the requirements may be gained from the following extracts from Specification 43-139 covering Army map paper:

1. *Tearing Resistance*—tearing resistance shall average not less than 95 grams, both with and across the grain (standard Elmendorf).

2. *Folding Endurance*—the average folding endurance in each direction shall be not less than 700 double folds (MIT tester) at a tension of 1 kilogram.

3. *Bursting Strength*—the bursting strength shall average not less than:

Dry Mullen—50 pounds per square inch

Wet Mullen—20 pounds per square inch

Wet strength shall be determined by making standard tests after soaking samples in water for one hour at 23 C.

4. *Tensile Strength*—The tensile strength of strips 15 mm. wide shall average not less than:

	Machine Direction	Gross Machine Direction
Dry	11 kilograms	6 kilograms
Wet	3.5 "	2.5 "
Oil	9 "	5 "

Wet tensile tests are made as noted above for Mullen tests. Strength when oil-soaked shall be determined by making standard tests after soaking samples in No. 308 mineral oil for 2 hours and scraping off excess oil.

5. *Expansivity*—For a relative humidity change of 15 per cent (by TAPPI method), the dimensional change of the paper shall be not greater than the following:

With machine direction 0.075%
Cross machine direction 0.25%

6. *Water Resistance* — Time of water penetration by dry indicator method shall be not less than 55 seconds.

Without going into a detailed discussion of these points, it is obvious that only paper of exceptional quality can meet the requirements and that only mills having the proper equipment and suitable production methods can turn out the large tonnage of paper needed so urgently. Notable among a number of firms engaged in this work is The Chillicothe Paper Company of Chillicothe, Ohio. During peacetime this company had established an enviable reputation for the production of offset paper. The mill makes use of the most up to date machinery and processing methods. Typical of the advanced manufacturing technique is the control of temperature and humidity in the finishing operations. All dimensioning steps are carried out in an air-conditioned building, where a temperature of 72 Fahr. and relative humidity of 50 per cent are maintained. This precise control insures uniformity in the size of the finished sheets.

A urea formaldehyde resin* was adopted by Chillicothe Paper Company for use in the production of quality Army map paper. The process involved in the application of the resin is very simple in that the resin solution, as supplied is merely added to the beater and to the starch solution at the tub. No additional equipment is required and all steps in the procedure follow closely conventional papermaking practice.

(*) Uformite 467.

The resin possesses the unique quality of complete water solubility in all proportions. This characteristic allows it to be uniformly dispersed throughout the stock in the beater, machine chest, or head box. Under the influence of alum, the resin is retained by the fiber to a degree not attained by conventional urea formaldehyde resins. After drying, the finished sheet shows vastly improved wet strength and considerably improved dry strength as well.

Several million pounds of Army map paper have been made with this resin over the past few months. Control tests have shown the paper to be remarkably uniform in day-to-day production and to meet very adequately the performance specifications. An average of several tests on the tensile properties of such paper are given below:

Tensile Properties of Map Paper

	Uformite 467		Specification 43-139	
	Dry	Wet	Dry	Wet
Machine Direction	12.5	4.5	11	3.5
Cross Machine Direction	7.38	2.73	6	2.5

Present uses for this urea formaldehyde resin, in addition to map paper, include bag paper, food wraps, blueprint and chart paper, toweling and many other specialty applications.

Free and Slow Kraft Pulps

O. WALTER A. RODOWSKI

▸▸▸ FREE AND SLOW kraft pulps may be an old subject to most everybody connected with the kraft paper industry; yet when a papermaker says that the pulp is getting too short and free, and no matter what is done, he cannot improve it, then the subject is new again.

Since the stock on the wet end of a machine shows that it is getting short and free, the evidence is there. Thereupon, testers have to get busy to find out what can be done about it.

The freeness tester is worked overtime. The beater and the jordan settings are changed to effect an improvement. Still when everybody is through experimenting, very little has been accomplished. Usually nothing can be found in the beater room or the wet end of the paper machine which may lead to the cause. So the pulp is blamed for it, and the pulp furnish to the beaters is changed. In self-contained mills, the digester formula is checked over and changed, and at times changes are made in the supply from the wood yard.

Since the pulp has had to take the blame, it was deemed advisable to investigate it. Little was found in the usual testing methods to throw any light on this matter. Therefore, different testing methods had to be developed. Since the wet end of the paper machine brought out the points of behavior, it seemed in order to try to duplicate the wet end operations in the laboratory and with this duplication to study various pulps at different degrees of refining.

The premise upon which the study was based was very simple: namely, if a pulp becomes slow on refining, the total slow water would increase as the refining progresses.

Since this total slow water consists of the water retained and removed by suction, pressing, and the removal of water by drying, it seemed in line to determine these points. For a matter of record, the bursting strength, tearing resistance, and freeness determinations were included. Also microphotographs were taken at various stages of the refining operation.

The following equipment was used for the investigation:

Abbé ball mill equipped with a revolution counter and operating at 60 rpm. Also 6 jars (numbered from 1 to 6 inclusive).

Mullen tester

Elmendorf tearing tester

Canadian Standard freeness tester

Modified drainage tester (Figure 1)

Total slow water tester (Figure 2)

Apparatus for suction water determination (Figure 3).

Sheet mould (8 in. x 8 in.) having a 4 in. x 36 in. barometric leg, and a perforated plate agitator with 1 in. perforation on 1¾ centers.

Hydraulic press (8 in. x 10 in.) connected to a water line having a constant head of 52 lb. gauge pressure.

Steam hot plate (8 in. x 10 in.).

Projector to study the fibers and to make microphotographs.

Testing Methods

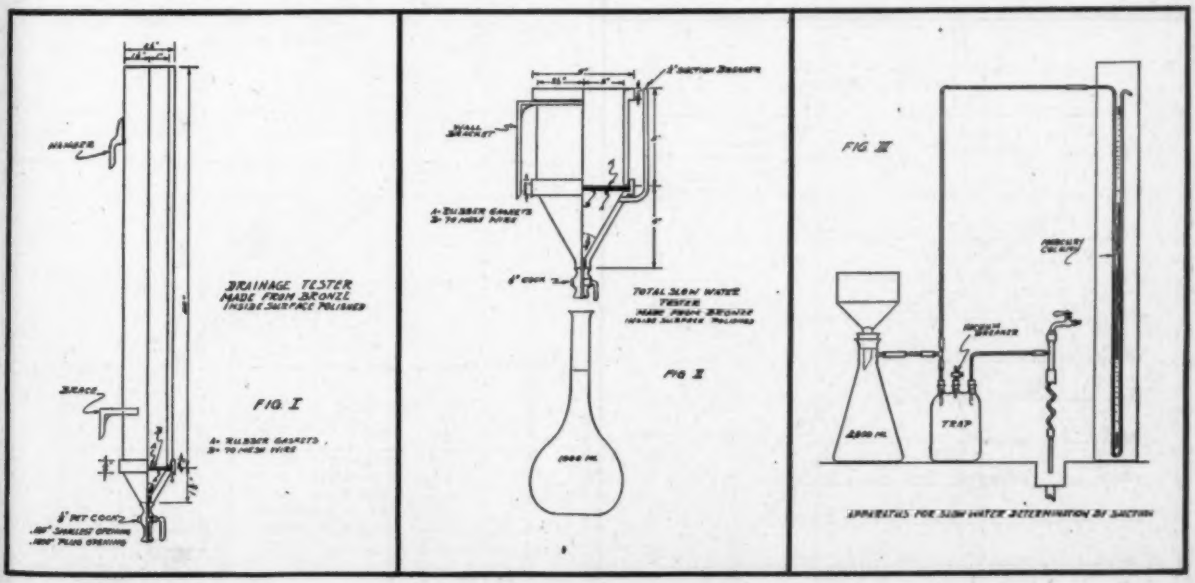
Basic weights, bursting, and tearing determinations were made in a bone dry condition.

After a pulp to be tested was soaked in water, mixed, pressed, and broken up into small pieces, portions having the equivalent of 50 grams BD were weighed out, placed into the ball mill jars, and water at 30 C. added to bring the total liquid volume to 2,000 ml. A sufficient number of jars were used to bring the strength development beyond the bursting peak.

The jars were placed into the ball mill in numerical order, taking note of the number on the revolution counter. Every 45 minutes a jar was removed for pulp testing. This time interval enabled the operator to finish all tests before the next jar was ready to be taken out of the machine.

No initial tests were made of any pulp except the determination of the Bjorkman permanganate number because some pulps were received in a dry state.

As soon as a jar was taken from the machine, the pulp was washed into a cylindrical tank and the total volume brought up to 16 liters. After



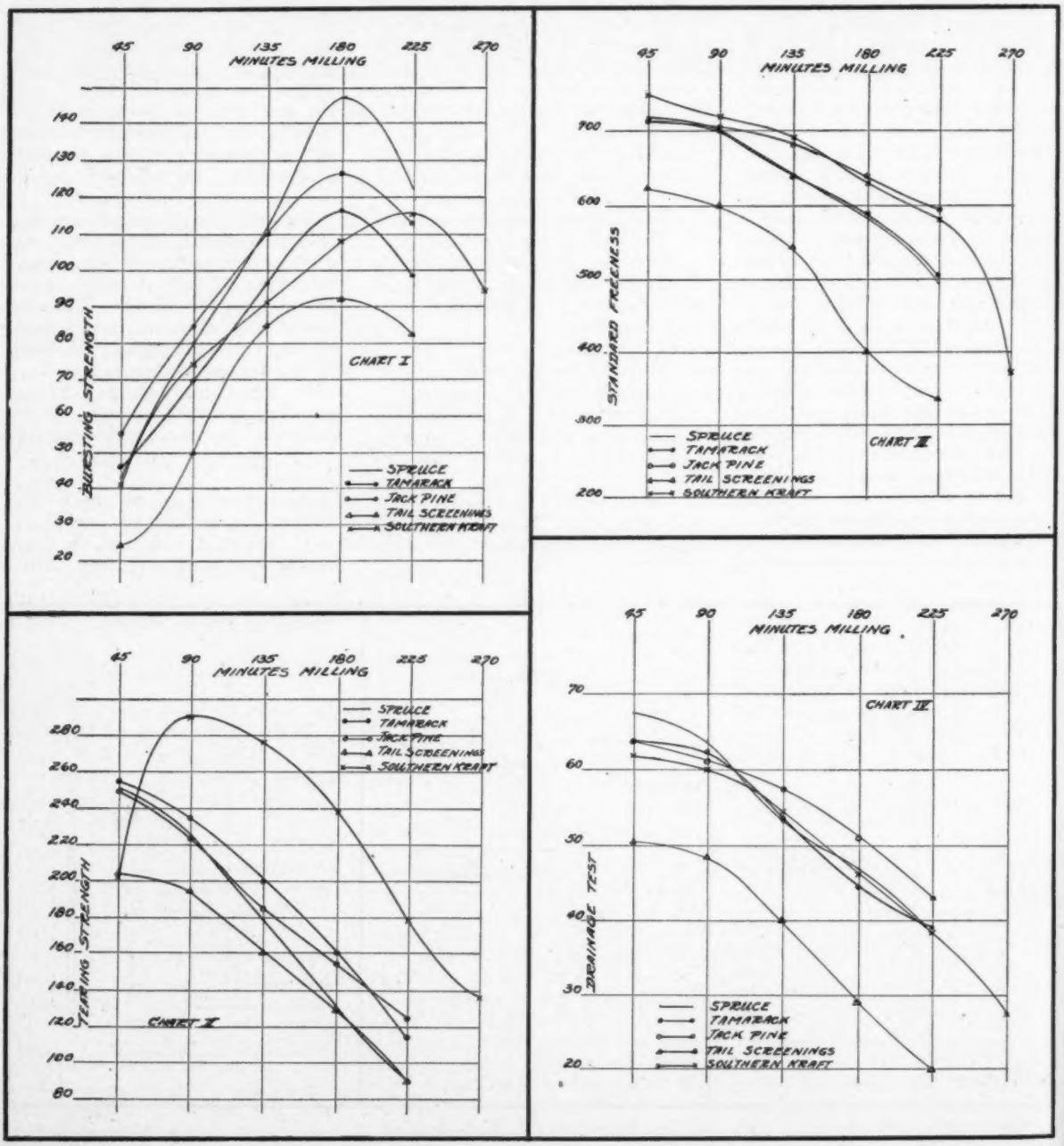
Left to Right—Figure 1, Figure 2, Figure 3

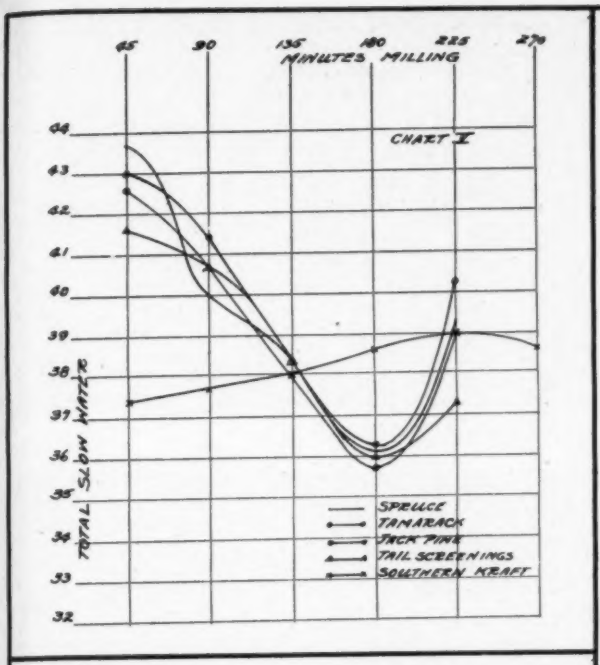
thorough mixing, two 1,000 ml. portions and a small sample for microscopic work were taken.

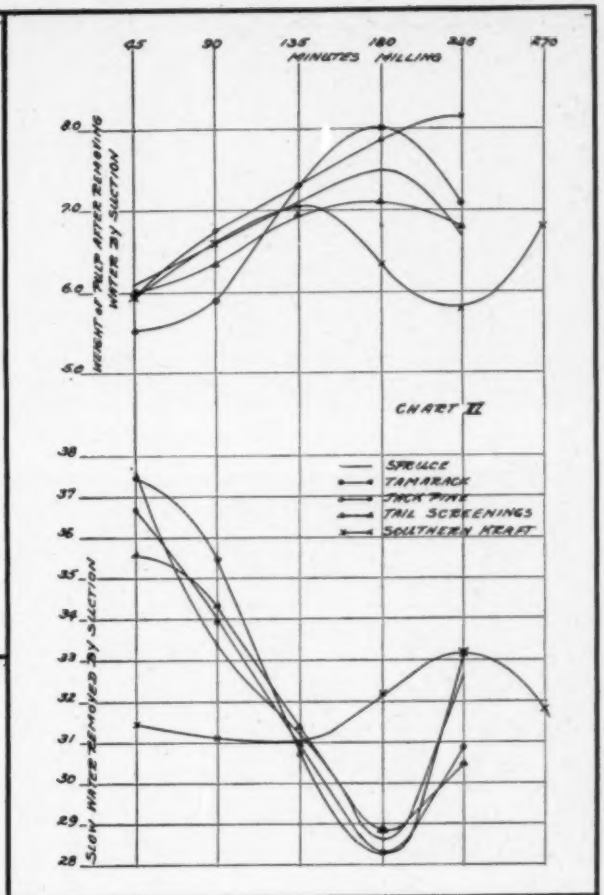
One 1,000 ml. sample was used for the standard freeness determination. After this test, the pulp and water were collected, brought up to 1,000 ml., well mixed, and poured into the drainage tester (Figure 1). The pet-cock opened quickly and the drainage volume of water over a 30 seconds period was determined by collecting it in a 1,000 ml. graduated cylinder.

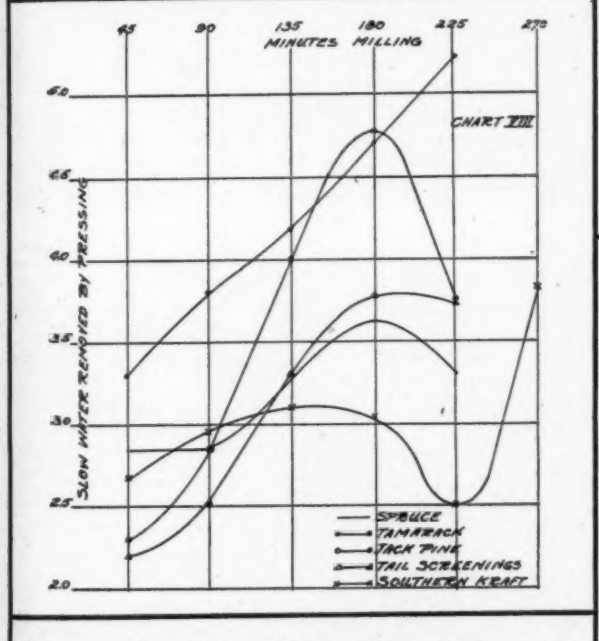
After the drainage test, the pulp and water was made up to 1,000 ml., mixed well, and poured into the Total Slow Water tester (Figure 2). The drain cock of this tester opened quickly and the free water collected in a 1,000 ml. volumetric flask. As soon as the free water was removed from the pulp, water was added to the volumetric flask to bring the volume to the 1,000 ml. mark, from a 250 cc. burette. (The number of cc. of water required from the burette is the total slow water retained by the pulp.)

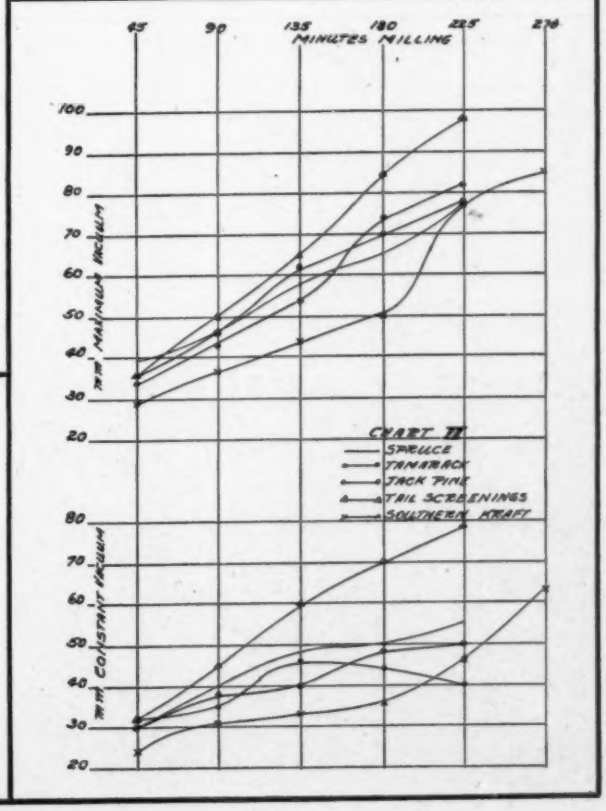
The pulp and the water from the total slow water test was mixed well and then poured into a 15 cm. Büchner funnel, the bottom of which was covered with a circle of filter paper, for the slow water determination by suction (Figure 3). Slow water retention after suction by the filter paper was determined and the total weight recorded. Then suction was applied. The vacuum on the mercury column was noted and a record was made of the maximum and the constant vacuum obtained. (A vacuum that held for 10 seconds was considered constant.) As soon as this condition was reached, the vacuum was broken, and the wet pulp and filter paper removed and weighed




MINUTES MILLING
45
90
135
180
225
270
CHART I
TOTAL SLOW WATER
SPRUCE
TAMARACK
JACK PINE
TAIL SCREENINGS
SOUTHERN KRAFT


MINUTES MILLING
45
90
135
180
225
270
WEIGHT of PULP AFTER REMOVING WATER BY SUCTION
CHART II
SLOW WATER REMOVED BY SUCTION
SPRUCE
TAMARACK
JACK PINE
TAIL SCREENINGS
SOUTHERN KRAFT


MINUTES MILLING
45
90
135
180
225
270
CHART III
SLOW WATER REMOVED BY PRESSING
SPRUCE
TAMARACK
JACK PINE
TAIL SCREENINGS
SOUTHERN KRAFT


MINUTES MILLING
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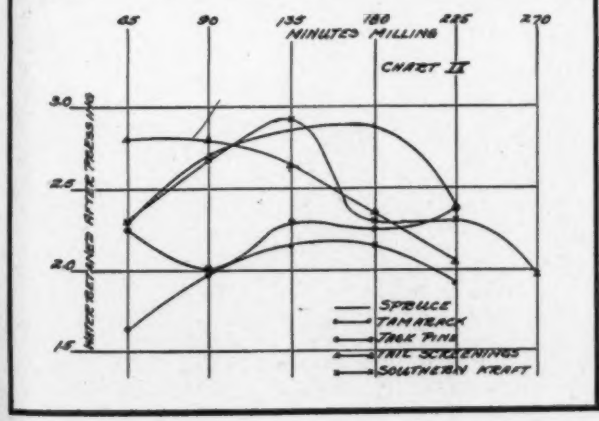
m/ MAXIMUM VACUUM
CHART IV
m/ CONSTANT VACUUM
SPRUCE
TAMARACK
JACK PINE
TAIL SCREENINGS
SOUTHERN KRAFT


MINUTES MILLING
45
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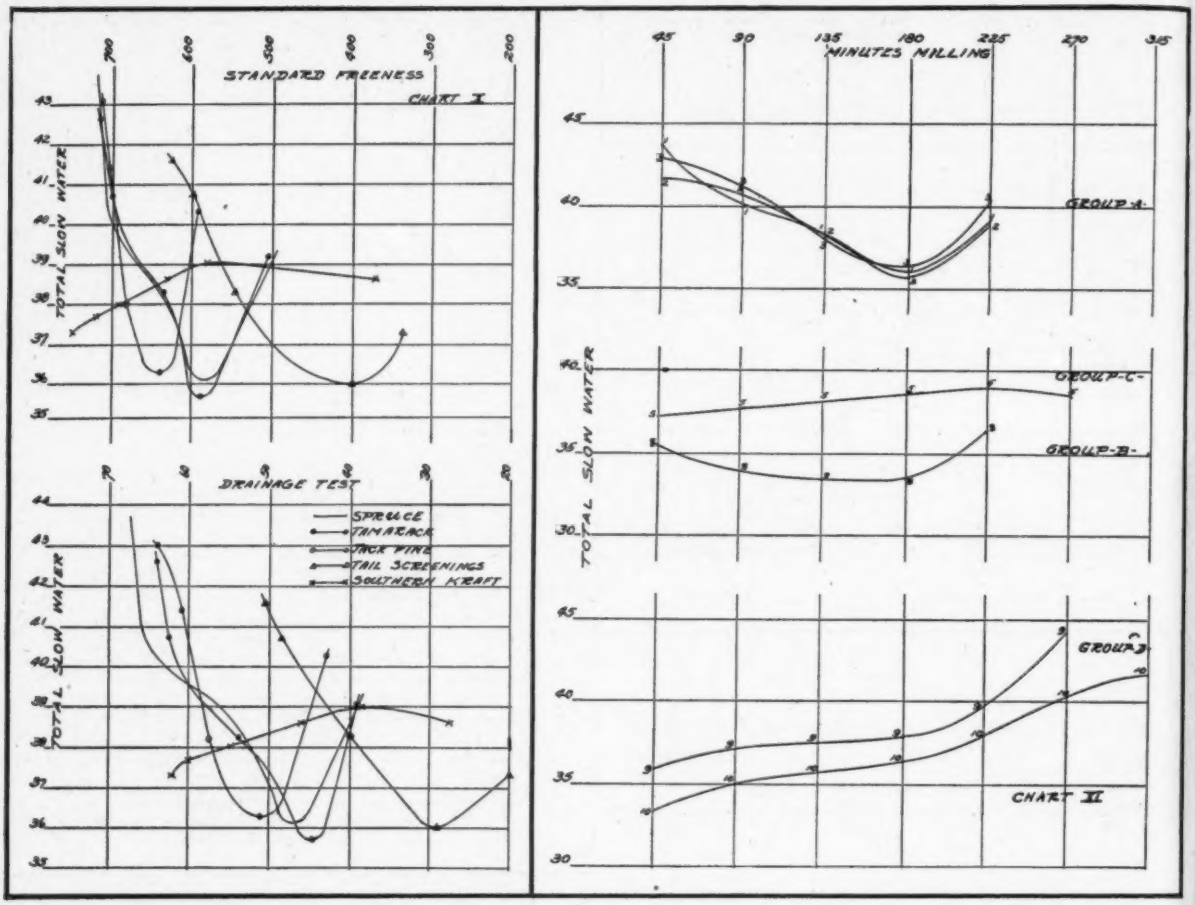
225
270
CHART II
WATER RETAINED AFTER PRESSING
SPRUCE
TAMARACK
JACK PINE
TAIL SCREENINGS
SOUTHERN KRAFT



quickly to the nearest 0.01 gram. The weight of the wet filter paper was subtracted. The pulp was dried, cooled in a desiccator over sulphuric acid, and weighed to the nearest 0.01 gram. The difference between the wet weight of the pulp and the dry weight equals the slow water retained after suction.

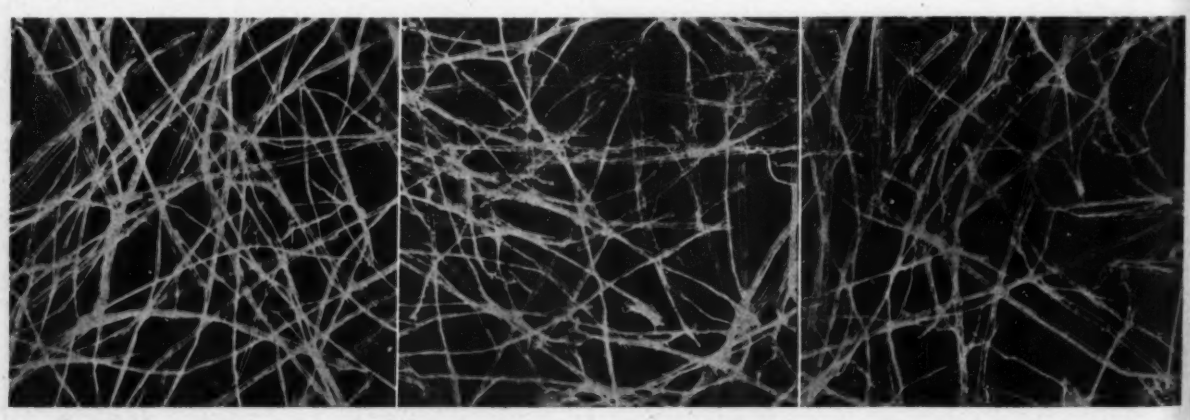
By dividing the slow water retained after suction by the BD weight of the pulp, the slow water retained after suction per gram of pulp is obtained.

The BD weight of the pulp after the determination for slow water by suction was also used for correcting the standard freeness and the drainage tests.

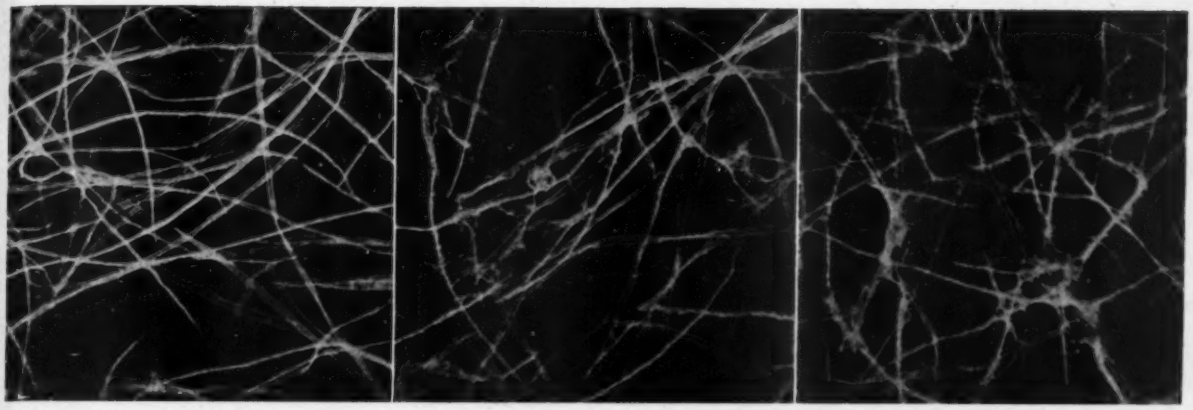
By dividing the slow water retained after suction by the BD weight of the pulp, the slow water retained after suction per gram of pulp is obtained.

The slow water removed by suction is obtained by subtracting the slow water retained after suction from the total slow water.

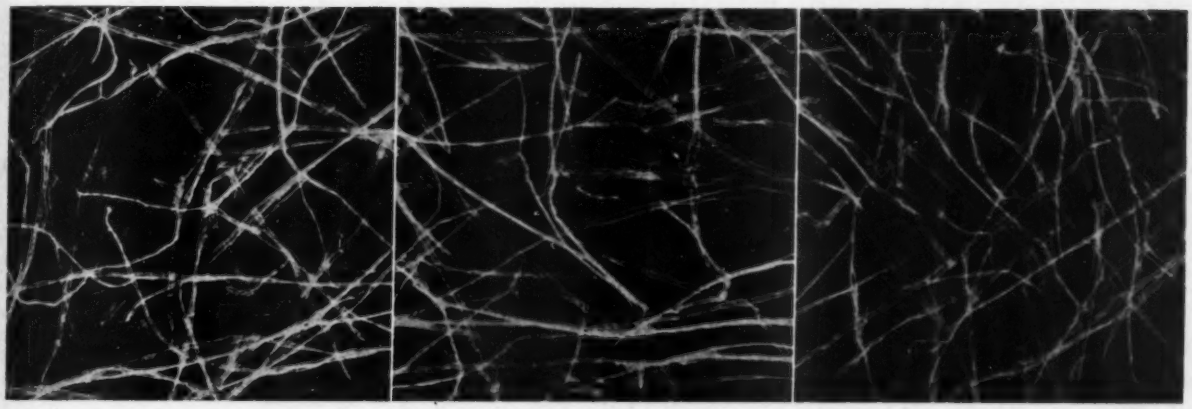
The other 1,000 ml. taken from the tank was diluted to one gallon, poured into sheet mould, mixed well with perforated plate agitator and the sheet formed. The sheet was couched by means of a clean dry pickup felt and a 15 lb. couch roll. It then was pressed between the pickup felt and a clean, dry, press felt in a hydraulic press for 30 seconds at 52 lb. gauge pressure.



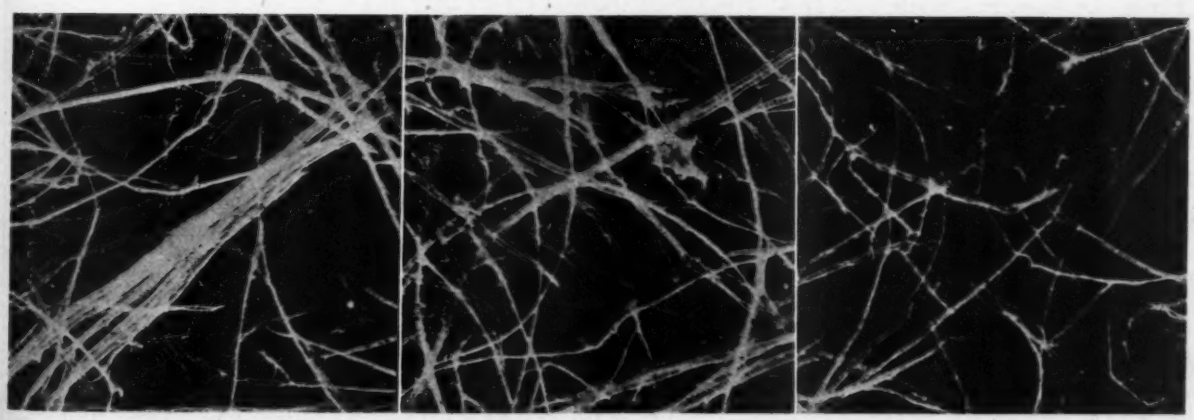
Spruce, milling time (L. to R.) 45, 180, 225 minutes



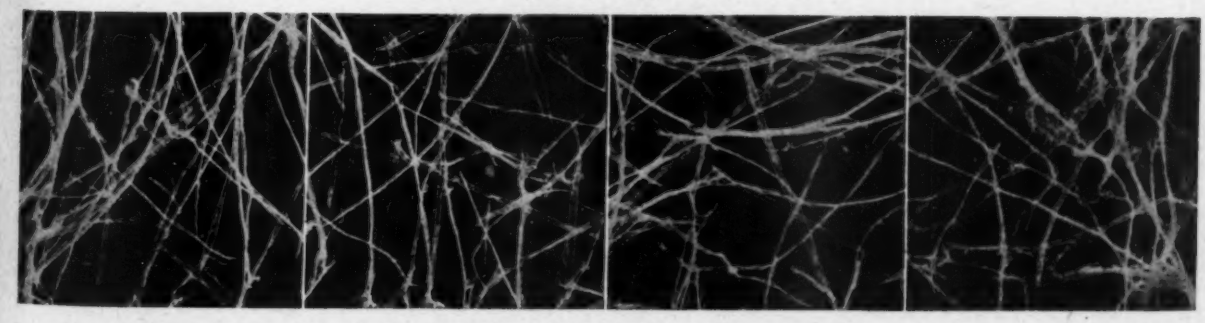
Tamarack, milling time (L to R) 45, 180, 225 minutes



Jack pine, milling time (L to R) 45, 135, 225 minutes



Tail screenings, milling time (L to R) 45, 135, 225 minutes



Southern kraft, milling time (L to R) 45, 90, 135, 270 minutes

For the slow water determination by pressing, the sheet was removed from the press and felts, weighed quickly (without creasing) to the nearest 0.01 gram, and then dried on a steam hot plate at about 105 C., and weighed in a heated balance to the nearest 0.01 gram.

The dry weight subtracted from the wet weight equals the number of grams of slow water retained after pressing. This figure divided by the number of grams of the BD pulp equals the grams of slow water retained per gram of BD pulp. The grams of slow water retained after pressing subtracted from the slow water retained after suction equals the number of grams of slow water removed by pressing.

The dry handsheet was cut into proper sizes for making bursting and tearing strength determinations and weighed in a heated balance at constant weight to determine the 24 x 36-480 basis weights. The sheets were next placed into a desiccator and after cooling were tested in the BD condition.

Spruce, tamarack, jack pine, tail screenings, and southern kraft pulps were tested by this method in duplicate. Very close checks were obtained on all tests with the exception of the slow water by suction and pressing. These tests gave only reasonably close results.

The tail screenings were used as a substitute for raw pulp.

The average test results are given in the accompanying tables. These data also include the Bjorkman permanganate number, bursting strength, tearing resistance, standard freeness, and total slow water of five other pulps designated as 6, 7, 8, 9 and 10.

Charts I, II, III, IV, V, VI, VII, VIII, and IX illustrate graphically the same data as covered by the table.

The microphotographs deal with the several grades of pulp as designated. The numbers under the illustrations indicates the milling time in minutes.

The recorded data do not mean that all pulps made from the woods studied would react in the same manner. It simply means the pulps tested reacted in this way.

Charts I and II show the strength relations between the pulps tested.

Charts III and IV show comparative freeness tests between the standard and the drainage test against milling time. The latter was introduced to learn if it would give results that the standard test did not. It may be said the drainage tester shows more consistent results as the refining progresses.

Chart V deals with the total slow water and shows that four of the pulps became free while one pulp became slower.

Chart VI shows that the greatest amount of slow water was removed by suction in ever decreasing quantities as the refining progressed, except in one case where the slow water removal was practically constant up to 135 minutes milling time and from then on the removal was increased. It seems that slow water removal by suction has the tendency to bring all pulps on a slow basis illustrated by the weight of pulp after removing water by suction. Here some pulps develop to be slower than others. In one instance, the pulp actually became free after 135 minutes milling time.

Chart IX deals with the slow water to be removed by drying. At this point, some pulps become slow to a varying degree while other pulps become free.

Chart VIII shows that pulps do become free and some more than others.

MILLING TIME	SPRUCE	TAMARACK	JACK-PINE	TAIL SCREENINGS	SOUTHERN KRAFT	6	7	8	9	10
					BJORKMAN PERMANGANATE NUMBER					
0	112	100	115	.....	109	120	100	100	110	112
					BURSTING STRENGTH					
45	43.2	46.2	55.2	24.1	41.2	25.0	56.0	53.6	27.2	27.8
90	80.0	69.6	84.4	47.7	74.1	55.0	83.7	63.5	49.3	78.1
135	112.2	96.3	110.0	85.2	90.9	85.5	110.8	95.1	85.0	95.4
180	143.6	116.3	126.4	91.8	108.2	111.0	128.5	110.0	108.4	107.3
225	122.2	98.4	113.2	82.5	115.5	108.4	114.1	96.5	120.5	122.3
270	.....	.....	.....	.....	94.3	.....	.....	.....	116.2	144.5
315	.....	.....	.....	.....	.....	.....	.....	.....	.....	129.5
					TEARING STRENGTH					
45	250	255	250	205	202	235	236	200	310	245
90	225	235	224	195	289	220	220	214	290	311
135	180	200	185	160	276	202	180	190	252	267
180	132	160	156	130	238	171	152	133	204	229
225	90	115	125	90	178	145	115	90	165	171
270	.....	.....	.....	.....	136	.....	.....	.....	100	138
315	.....	.....	.....	.....	.....	.....	.....	.....	.....	105
					STANDARD FREENESS					
45	720	715	715	625	750	720	715	715	730	740
90	700	700	705	600	720	690	695	705	710	720
135	640	640	680	545	690	660	660	665	675	685
180	585	590	640	400	630	625	630	635	630	625
225	495	505	595	335	580	590	590	580	605	605
270	.....	.....	.....	.....	370	.....	.....	.....	445	540
315	.....	.....	.....	.....	.....	.....	.....	.....	.....	495
					TOTAL SLOW WATER					
45	43.7	42.6	43.0	41.6	37.3	46.4	43.7	35.5	36.0	33.4
90	40.0	40.7	41.4	40.7	37.7	44.2	41.7	33.9	37.0	35.0
135	38.3	38.3	38.0	38.3	38.0	40.6	40.2	33.3	37.5	35.8
180	36.1	35.7	36.3	38.2	38.6	38.2	38.2	33.4	37.8	36.4
225	39.3	39.0	40.3	38.6	39.0	38.6	40.0	36.5	39.6	38.0
270	.....	.....	.....	.....	38.6	.....	.....	.....	44.2	40.3
315	.....	.....	.....	.....	.....	.....	.....	.....	.....	41.7

This condition may be accelerated greatly by an increase in pressure.

Chart VII reveals two pertinent vacuum readings. The maximum reading is reached about the time the excess slow water is removed. The reading becomes constant when only air currents are passing through the sheet.

These readings do not seem to indicate whether a pulp becomes free or slow on refining. They appear to show a relation to voids. A vacuum reading could be low because of the removal of excess water and only air is passing through the sheet. The fact that voids are under consideration can be demonstrated by changing quantities of filler or short fibered pulps.

Some fibers are slower than others. Even when the freeness readings are the same. Chart X shows comparisons between freeness and total slow water. It is this condition that may be the reason that the consistency in the machine head box is changed in order to carry the water to the proper place on the wire, or that the vacuum is adjusted to obtain necessary results.

The greatest number of operating changes of this kind would be made in plants where various purchased pulps are used, and/or in plants making pulps from different woods.

The microphotographs reveal the following:

Spruce—Very little swelling and fibrillation up to 180 minutes milling time. At 225 minutes, the fibers are broken and show more fibrillation. Fibrillation appears to be attached to the fibers.

Tamarack—Fibers completely swollen at 90 minutes. From then on, they break increasingly. At 180 minutes, the fibrillation is complete. Starting with 135 minutes, the fibers decrease in thickness. At 225 minutes, the fibers not only are shorter and thinner but seem to lose the fibrillation.

Jack pine—Very little change in thickness of the fibers and hardly any fibrillation. The greatest amount of fibrillation noted at 180 minutes. At 225 minutes, very little of fibrillation is left. As a whole, these fibers do not break up materially.

Tail Screenings — Continued decrease in length and width of fibers with increasing fibrillation. At 225 minutes, the fibers are not only shorter and thinner, but there also is considerably detached fibrillation.

Southern kraft—An increase in swelling of the fibers takes place up to and including 135 minutes milling time. At this point, the fibrillation begins, and it increases as refining progresses. Very little detached fibrillation noted considering the amount taking place.

Milling time	Spruce	Tamarack	Jack Pine	Tail screenings	Southern Kraft
		DRAINAGE TEST			
45	67.5	64.0	64.0	50.5	62.0
90	64.0	62.5	61.0	48.5	60.0
135	53.0	53.5	57.5	40.0	54.5
180	47.0	44.5	51.0	29.0	46.0
225	38.5	39.0	43.0	20.0	38.5
270	.....	.....	.....	.....	27.5
		WEIGHT OF PULP AFTER SUCTION			
45	5.12	5.95	4.55	4.98	4.97
90	5.58	5.77	4.88	5.35	5.62
135	6.12	6.32	6.30	5.95	6.03
180	6.49	6.85	7.02	6.12	5.33
225	5.68	7.15	8.12	5.78	4.80
270	.....	.....	.....	.....	5.80
		SLOW WATER REMOVED BY SUCTION			
45	38.58	37.65	38.45	36.62	32.43
90	34.42	34.93	36.52	35.35	32.08
135	32.18	31.98	31.70	32.35	31.97
180	29.61	29.85	29.28	29.88	32.27
225	33.62	31.85	34.18	31.52	34.20
270	.....	.....	.....	.....	32.80
		mm MAXIMUM VACUUM OBTAINED			
45	29	36	34	36	29
90	46	46	43	50	37
135	58	62	54	65	44
180	65	70	74	85	50
225	77	78	82	98	77
270	....	....	....	....	85
		mm CONSTANT VACUUM OBTAINED			
45	30	32	30	32	24
90	40	35	38	45	31
135	48	46	40	60	33
180	50	44	48	70	36
225	55	40	50	79	46
270	....	....	....	....	63
		WET WEIGHT OF PULP AFTER PRESSING			
45	3.28	2.65	3.25	3.79	3.29
90	3.72	2.97	3.02	3.82	3.67
135	3.85	3.15	3.30	3.65	3.92
180	3.88	3.15	3.25	3.35	3.29
225	3.38	2.93	3.37	3.05	3.31
270	.....	.....	.....	.....	2.98
		SLOW WATER REMOVED BY PRESSING			
45	2.84	3.30	2.30	2.19	2.68
90	2.86	3.80	2.86	2.53	2.95
135	3.27	4.17	4.00	3.30	3.11
180	2.88	2.15	2.25	2.35	2.29
225	2.38	1.93	2.37	2.05	2.31
270	.....	.....	.....	.....	1.98
		SLOW WATER REMOVED BY DRYING			
45	2.28	1.65	2.25	2.79	2.29
90	2.72	1.97	2.02	2.82	2.67
135	2.85	2.15	2.30	2.65	2.92
180	3.61	4.70	4.77	3.77	3.04
225	3.30	5.22	3.75	3.73	2.49
270	.....	.....	.....	.....	3.82

Fibers may be classified into the following groups:

1) Fibers that do not change materially in size and produce very little fibrillation.

2) Fibers that swell during refining; and, on breaking, leave the fibrillation attached.

3) Fibers that swell; and, on breaking, lose the fibrillation.

4) Fibers that became shorter and thinner, and lose the fibrillation about as fast as it is produced.

Correlation of the microphotographs with Chart IX, may show that an increase of slow water is associated with swelling of the fibers. If water is forced into the fibers until they burst, there will be a loss of water, and fibrillation will occur. In some cases, fibrillation remains attached to the fibers while in others it becomes detached.

Whenever the slow water remains fairly constant, the fibers do not change materially in size. Also, they produce very little fibrillation. In cases where the slow water is reduced

continually, the fibers not only reduce in length and width, but also lose their fibrillation about as fast as produced.

If the water retained after pressing may be designated as hydration, then changing pressure would still further increase or decrease it. This hydration seems to be a matter of loading and unloading the fibers with water. In this manner, the fibers may become short or free.

As a general rule, hydration gives a slippery feel to the pulp. This feeling apparently is not caused by the water in the fibers, but rather by a change in the surface condition—like fibrillation and shortening.

Although this testing procedure probably is not perfect, it served to show to what extent some pulps become free while others become slow, and that this condition may appear on the wire or while pressing or drying.

More emphasis could be placed on the determination of slow water. Perhaps in the past and even now, too much reliance has been put on the freeness test. After all, the test is only a measure of free water.

Both free and slow water are important for sheet forming and economical papermaking operations.

Obviously for everyday mill practice and laboratory control, this testing procedure is very cumbersome. Short cuts would be in order for such control work.

The total slow water test, however, reveals very quickly if a pulp will become free or slow. It may be found that this test would be a worthwhile addition in the pulp testing routine. The test might be of advantage especially in mills where pulps are made from various woods, or if pulp is obtained from various sources.

To learn how other pulps react as far as the total slow water is concerned, five more pulps were tested. Both domestic and foreign pulps were included. The results are shown in the table under 6, 7, 8, 9 and 10.

From all of these results, pulps were classified into four groups (Chart XI).

Group A—Become free and continue to increase in freeness until the peak of the bursting strength is reached.

Group B—Become moderately free until the peak of the bursting strength is reached.

Group C—Become moderately slow until the peak of the bursting strength

Group D—Become definitely slow throughout all the refining.

Various beater equipments were used to learn if pulps becoming free in the laboratory would repeat in the mill. The same tendencies were found. It was observed that very little could be done to change a free pulp into a slow pulp. This observation seems to place the burden of the trouble on the pulp and not on the refining (beating) equipment.

Pulps becoming free on refining may be of value for some grades of paper, while those pulps which become slow may be preferred for other grades.

Further work on the subject could be carried on to cover all grades of pulp. Possibly such work would develop a better understanding of some pulp and papermaking problems.

Welding Arc Is Important Construction and Repair Tool

▶▶▶ ALTHOUGH THE PROCESS of electric arc welding has long been acceptable as a valuable aid in all kinds of industrial fabrication and maintenance, the number of uses to which it is being applied in various industries continues to grow.

This is evidenced by a report recently submitted to The Lincoln Electric Company, Cleveland, Ohio, one of the world's largest producers of arc welding equipment, by the West Virginia Pulp and Paper Company, Williamsburg, Pennsylvania.

The variety of jobs to which arc welding has been applied around this pulp and paper mill indicates how this modern process for joining metals is relied upon for normal upkeep and wartime operation.

Two smokestacks, for example, with diameters of 4 feet, 6 inches and 5 feet, 6 inches and lengths of 60 feet and 80 feet respectively, were entirely fabricated by butt welding. The stacks were built to replace two stacks of riveted design.

The inherent simplicity of welded construction has also been a big factor in designing and fabricating guards for the plant's machinery. Pieces of metal, frequently scrap items, are merely cut to size and shaped as required, then fitted together and welded into one-piece rigid guards.

The firm reports that broken machine shafts no longer mean long periods of "down" time awaiting repairs or new parts. The shafts are now quickly weld-repaired by fitting a sleeve over the fracture and welding solid at the joints.

When a shaft becomes worn, the worn area is built up with weld metal and machined down to original dimensions.

Fig. 1—Discharge end of log washing unit shown, ejects logs into weld-reinforced conveyor

Other practical uses of welding around the plant include the building and repair of hoppers for lime, clay, coal and logs, and the maintenance of coal and log conveyors.

One interesting welding job described in the report involved the repair and strengthening of the end and sides of two log conveyors used in the company's log washing equipment.

Previously the sides of the log conveyors were of wood which required considerable maintenance due to wear and breakage. Logs would frequently catch in the rough portions, breaking either the plank side pieces or the drive chain of the conveyor. Figure 1, showing the logs as they are discharged from the washer into the conveyor, indicate the heavy impacts to which the conveyors are subjected.

This troublesome problem was solved by reinforcing the conveyor sides with ¾-inch steel plate to which 8-inch I-beams were welded. Mild steel electrode was used to deposit intermittent welds along the joint at both sides of the beam with solid welding at the ends (Figure 2).

As the logs are ejected from the washer unit, they now strike the channel reinforcements which are designed to withstand severe shocks, thus avoiding previous breakdowns.

The conveyor is further reinforced by arc welding steel wear plates longitudinally in the structure at the point where the drive chain contacts the conveyor surfaces.

The metal chain "skid" is composed of two L pieces fillet welded to a channel center section as shown in Figure 3. The wear plates are tack welded to the tops of the L's and the beam, thus considerably prolonging the life of the conveyor along the section subjected to friction wear caused by the moving chain.

These and many other jobs around the pulp and paper mill that are made possible by the simple application of the welding arc, have made the process practically indispensable in plant operation and maintenance.

Fig. 2—Portion of conveyor construction showing metal plate and I beams welded into single reinforcement for sidewall protection against impact of logs

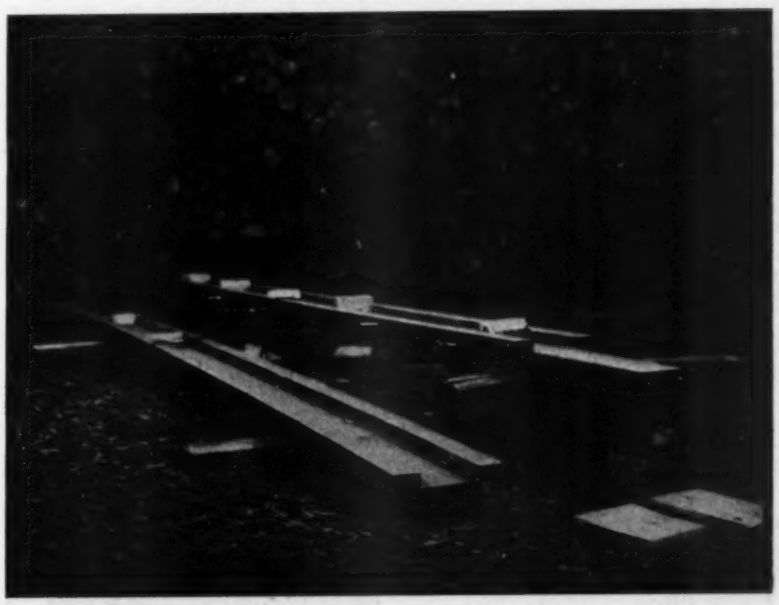
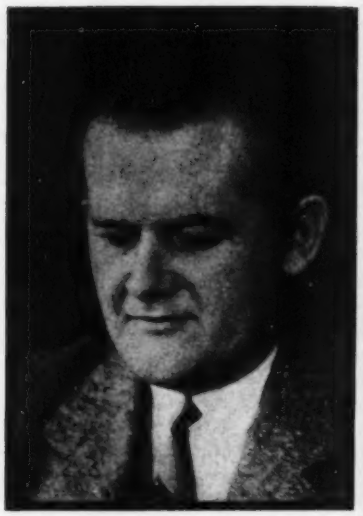


Fig. 3—View of welded channel structure to which wear plates are fused to prevent premature wear from drive chain of log conveyor

WELDERS' CLOTHING—Safety clothing is as much part of the arc welder's equipment as the helmet and goggles. Cotton shirts and dungarees worn in warm weather can be ignited quite easily and the protection of chrome-tanned leather may avoid serious burns and loss of valuable time. The garments available in welders' leather include overalls, pants, chaps, aprons, jackets, sleeves, gloves, mittens and spats. Garments should be of good quality leather, solidly constructed, and provided with fastening to prevent gapping open during body movement. Fastenings should be so designed that the wearer can get out of the garment quickly. There should be no turned-up cuffs or other projections to catch hot metal. Pockets should be equipped with flaps which can be fastened shut.

—From "Safety Clothing," published in *National Safety News* (March, 1945)

A Lubrication Control System for Paper Machines



E. D. BEACHLER
Assistant Chief Engineer
Beloit Iron Works

AUTHOR'S NOTE: Certainly there is no substitute for good lubrication. Mill men of today who are alert to possible improvements in lubrication practices, may wish further details of the system outlined in this article. This information may be obtained by addressing the author in care of Beloit Iron Works, Beloit, Wisconsin.

▶▶▶ CORRECT LUBRICATION on high-speed paper machines is of prime importance. It is, of course, simple to say that correct lubrication means the application of the right lubricant between wearing surfaces; the film must be *maintained*. And the all-important factor of maintenance requires close and careful control of the quantity and quality of lubricant employed.

The wartime importance of methodical lubrication was re-emphasized for Beloit at the time we were contemplating a series of plant maintenance posters, of which the general theme was "Don't trust your memory on maintenance work." Lubrication loomed so large that a single poster, we felt, would not do justice to the subject.

After extensive consultation with mill managers, engineers, and others, we evolved, with the assistance of the Systems Division of Remington Rand, Inc., a positive yet easily applied Mill Lubrication Control System for checking and controlling the lubrication of our product in the field.

Basically, the Kardex system* that was worked out for application to Beloit paper machines is a method of organizing the *responsibility* and *procedure* on paper mill lubrication. The plan, however, can be adapted easily to all types of maintenance problems, and modified or expanded to accommodate small mills or large.

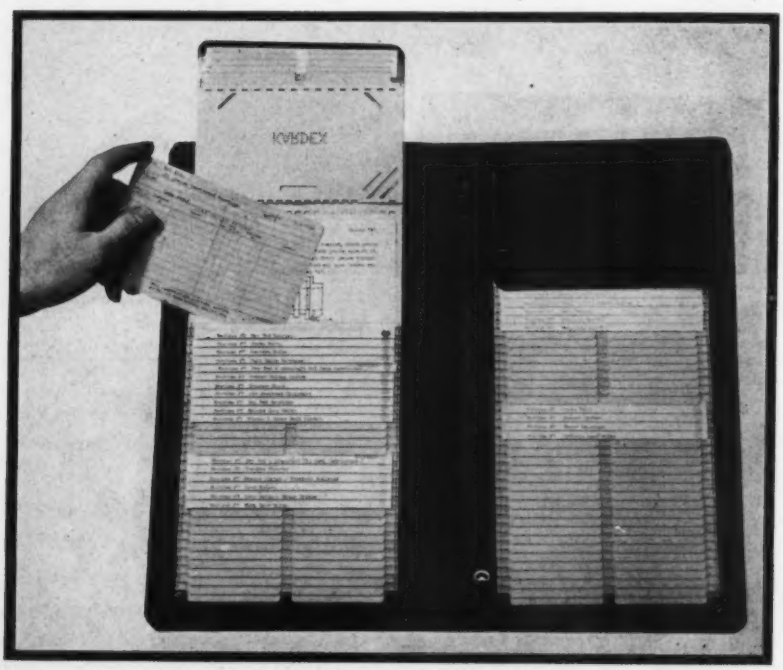


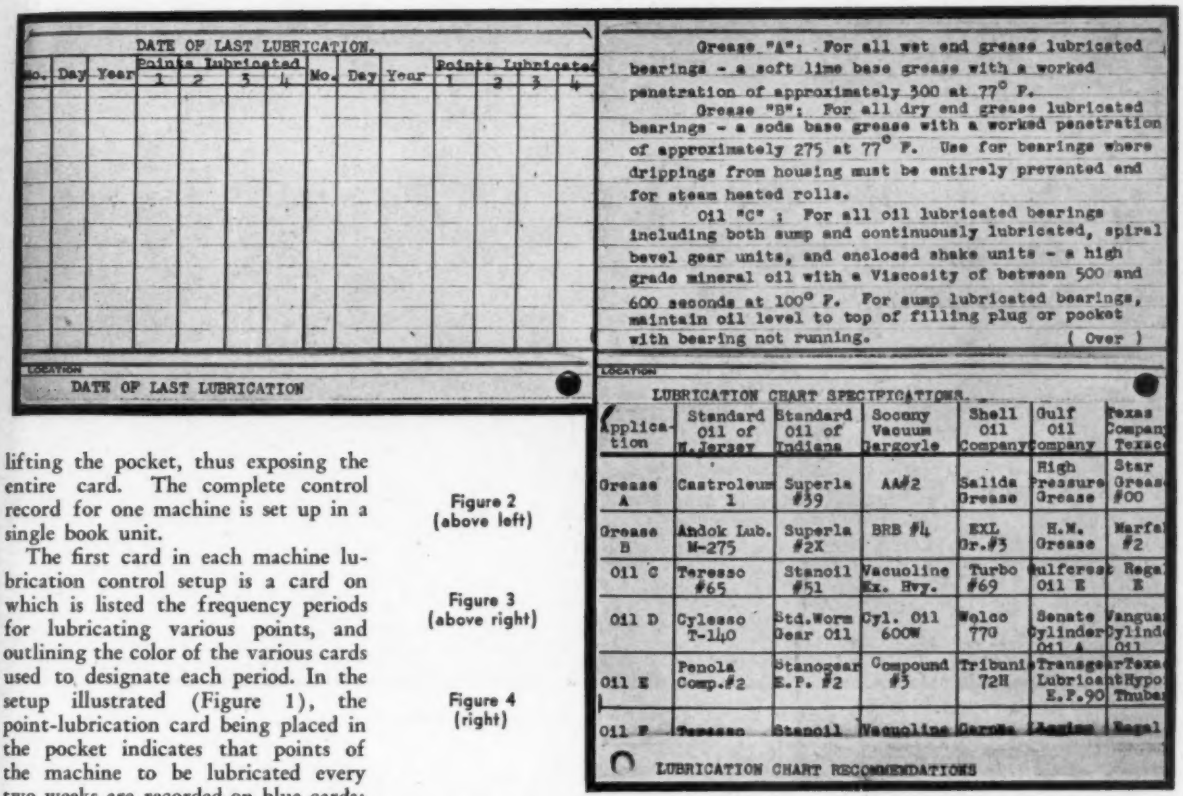
Fig. 1—Point-lubrication card being placed in pocket of portable record

The Visible Control System accomplishes the following: (1) it provides the means of checking and controlling frequency of lubrication; (2) it provides a detailed order card for the operator, covering each point to be lubricated; and (3) it establishes positive control in the mill office to insure that every lubrication point is serviced promptly in accordance with the established, predetermined schedule.

The Record Control System itself is compact, may be conveniently handled, and is so simple in operation that little clerical work is required to maintain it.

A series of cards is housed in a Kardex Book Unit, which is a convenient, folder-like portable record. Within the book unit is a series of pockets. Each pocket contains a card, which is visibly indexed at the bottom for convenience in locating. Reference, or posting, is made to the cards by merely

(*) The system was originally set up for the Gaylord Container Corporation's No. 7 machines. At the Mead Corporation, it is used in connection with a No. 4 Chillicothe, and at Berst-Forster-Dixfield in connection with No. 6 machines. In each case, there is a Kardex Control folder for each individual machine. The system, of course, can be applied to as many machines or to as much equipment as mill managers desire.



DATE OF LAST LUBRICATION.

Mo.	Day	Year	Points Lubricated 1	2	3	4	Mo.	Day	Year	Points Lubricated 1	2	3	4

LOCATION

DATE OF LAST LUBRICATION

Grease "A": For all wet end grease lubricated bearings - a soft lime base grease with a worked penetration of approximately 300 at 77° F.

Grease "B": For all dry end grease lubricated bearings - a soda base grease with a worked penetration of approximately 275 at 77° F. Use for bearings where drippings from housing must be entirely prevented and for steam heated rolls.

Oil "C": For all oil lubricated bearings including both sump and continuously lubricated, spiral bevel gear units, and enclosed shake units - a high grade mineral oil with a Viscosity of between 500 and 600 seconds at 100° F. For sump lubricated bearings, maintain oil level to top of filling plug or pocket with bearing not running. (Over)

LOCATION

LUBRICATION CHART SPECIFICATIONS.

Application	Standard Oil of N.Jersey	Standard Oil of Indiana	Socony Vacuum Gargoyle	Shell Oil Company	Gulf Oil Company	Texas Company Texaco
Grease A	Castroleum 1	Superla #39	AA#2	Salida Grease	High Pressure Grease	Star Grease #00
Grease B	Andok Lub. M-275	Superla #2X	BRB #4	EXL Gr.#3	H.W. Grease	Marfak #2
Oil C	Teresso #65	Stanoil #51	Vacuoline Ex. Hvy.	Turbo #69	Gulfcrest Oil E	Regal E
Oil D	Cylesso T-140	Std.Worm Gear Oil	Cyl. Oil 600W	Valco 770	Senate Cylinder Oil A	Vanguard Cylinder Oil
Oil E	Penola Comp.#2	Stanogear E.P. #2	Compound #3	Tribunal 72H	Transgear Lubricant E.P.90	Texaco Hypoid Thuban
Oil F	Teresso	Stanoil	Vacuoline	Carnea	Regina	Regal

LUBRICATION CHART RECOMMENDATIONS

Figure 2 (above left)

Figure 3 (above right)

Figure 4 (right)

lifting the pocket, thus exposing the entire card. The complete control record for one machine is set up in a single book unit.

The first card in each machine lubrication control setup is a card on which is listed the frequency periods for lubricating various points, and outlining the color of the various cards used to designate each period. In the setup illustrated (Figure 1), the point-lubrication card being placed in the pocket indicates that points of the machine to be lubricated every two weeks are recorded on blue cards; points lubricated every three months are recorded on salmon cards; and points lubricated only once each year are recorded on green cards.

The second card (Figure 2) is designed for recording a running history of the actual lubrication of all points to be serviced in each frequency. It is posted to show the date on which the machine was lubricated, with a check in the correct frequency column (1, 2, 3 or 4), as lubrication is completed on all points within a frequency period. Thus, date of last lubrication for all points serviced is always available in an accurate record for any reference purpose.

The third card (Figure 3) in the setup gives descriptive specifications of the various lubricants to be used. Greases and Oils are coded A to F. Thus, it is not necessary to write the complete specifications on each lubrication-point card—the proper lubricant is indicated by a code letter. All special applications not classified on the Lubrication Specification Card are furnished with lubrication plates, or have grade of lubricant specified on drawings.

The fourth card (Figure 4) in this setup shows the oil companies' various brand equivalents comparable to the different lubricating specifications.

Separate cards are then set up for each point to be lubricated, different colors indicating the frequency periods. All points to be lubricated within the same frequency period are filed consecutively. For example: All blue cards representing points to be lubricated every two weeks are filed in one group, salmon colored cards representing points to be lubricated every six months in another; and, finally, the green cards representing points lubricated once a year.

These cards are filed in the Visible Kardex Pocket behind a buff-colored Master Card. This card contains the same information as the Lubricating Point Card but is never removed from the pocket, so that information is always available in the file should the lubricating-point cards be mislaid or lost.

The master card has a folded stub with a small hole punched in the lower right-hand corner which is always visible. The color of the lubricating card shows through this hole when the card is in the pocket. However, when it is removed, the hole shows a dark brown spot which is printed on the master card. Reference to the hole on the visible margin of the pocket for each frequency period group, indicates immediately any cards that have been issued for lubrication and not returned.

When the person in the Control Office determines, by checking the "Date of Last Lubrication" card, that the time for the next lubrication has arrived, he removes all the cards for that frequency period from their pockets and forwards them to the man who actually does the lubricating.

On each card there is sufficient data to give the location of the point to be lubricated; a brief description of the unit, along with any special instructions; the type of lubricant to be used; and the number of fittings to be lubricated. This provides complete information for the guidance of the man actually doing the lubrication.

After the lubrication has been performed, the operator records the date, his initials, any any comments on the lower portion of this card. This builds up a complete history of the actual lubrication of each individual point.

After all points have been lubricated, the cards are returned to the Lubricating Control Record. The date on which the lubrication for this frequency period was completed is posted on the "Date of Last Lubrication" card. Reference to such dates enables the Control Office to determine time for next frequency period for each group and the running record assures the proper servicing of each group.

The basic information for this record for each specific machine can be prepared by Beloit. However, the record can be expanded and any additional information thought necessary

(*Concluded on page 56*)

A northern California forest fire (U. S. Weather Bureau photo)

Forest Fires and the U. S. Fire Weather Service

PAUL F. SUTTON
Fire Weather Forecaster
U. S. Weather Bureau

▶▶▶ FIRE SCARS on the big trees of California date back to the year 245 A.D., mute evidence that forest fires swept this country at an early date.

The Englemann spruces of Colorado show fire scars made in 1676, 1707, 1722, 1753, and 1781.

The Miramichi fire of October, 1825, in Maine and New Brunswick, swept over three million acres and took a toll of 160 lives.

The Middle West can point to one of the most calamitous fires in American history—the Peshtigo, Wisconsin, fire in October, 1871, which burned more than a million acres, with 1,500 lives lost.

Other disastrous fires in the Middle West were: the Phillips, Wisconsin, fire in July, 1894, which burned 100,000 acres and killed 300 people; the Hinckley, Minnesota, fire of September, 1894, in which 160,000 acres burned and 418 lives were lost; and the Michigan fire of 1881, in which a million acres were burned and 138 people killed.

The list of early fires in the far West is even larger, but, generally, fewer lives were lost.

The year 1910 is historic throughout the West as one of unprecedented forest fires. Idaho suffered the loss of two million acres of white pine timber and 85 lives, while the Baudette, Minnesota, fire, in October of the same year, burned 300,000 acres and destroyed 42 lives.

In 1918, the Cloquet, Minnesota, fire destroyed property and timber valued at thirty million dollars and claimed 400 lives.

The list is long and the loss is great, but it took the big fire of 1902 (variously called the Lewis River fire, the Columbia, Cispus, Yacolt or Cowlift fires) to bring about an organized attack on the problem of forest fire control and prevention. In this fire, millions of feet of some of the finest timber in the Northwest was destroyed, and sawmills, logs, railrod ties, settlers' homes, bridges, mining buildings, and countless numbers of wildlife were wiped out. Such spectacular and damaging fires have been rare in recent years, due mainly to the effective systems for combating and preventing forest fires which have been developed by federal and state forestry organizations. The U. S. Weather Bureau, through its Fire Weather Service, plays an important role in these systems.

Considerable research has been done by the U. S. Forest Service in the study of fire control and behavior. Experimental forest plots have been fired, and the rates of spread measured; resistance to fire control has been rated and the general fire behavior noted. Data collected from a large number of such experiments indicated that fire behavior is closely correlated to fuel type, fuel condition, fuel moisture, relative humidity of the air and current wind velocity, and direction.

Fuel type is usually classified as light, medium, or heavy, and refers mainly to size of the forest fuels. Fuel condition refers to the state of the lesser vegetation and is classified as green, curing, or dead. These factors are parameters which can be evaluated easily. However, the remaining factors—fuel moisture, relative humidity, and wind velocity—are variables which are not so easy to measure or to predict. Here the Weather Bureau enters the picture to perform a valuable and necessary service in supplying current and expected values for these variables.

Hardwood forests, pine forests, and grasslands all show different fire behavior, consequently, the factors listed above do not all apply to fire behavior in all sections of the country. For instance, key factors recognized in eastern forests are fuel moisture and number of days since last rain, wind velocity, condition of vegetation and season of the year. In Central and Lakes States, the number of days since last rain, relative humidity, wind velocity, and condition of vegetation are recognized. Terrain and climatic difference also must be considered, but, in general, some combination of the listed fire behavior factors is used in all sections of the country.

Fuel moisture is generally determined by the use of fuel moisture sticks. In western forests, the fuel moisture sticks are three cylindrical pieces of white pine, ½ inch in diameter and 20 inches long, pegged together with a separation of 1 inch, while in eastern forests three flat slats, 18 inches long, made of basswood, are used. In Central and Lakes States, fuel moisture sticks are not used, the factor of "number of days since last rain" being substituted.

Where sticks are used, they are first trimmed to an oven-dry weight of 100 grams and are then exposed at various places in the forests about 10 inches above the duff. The weight of these sticks will vary with their moisture content and a good quantitative indication of the moisture content of the forest fuels is obtained from this weight variation.

A simple balance scale, designed to read zero at 100 grams and calibrated in "fuel moisture percentage" is used for weighing the sticks. "Leeching" of the sticks introduces some error, but seasonal corrections are made.

Relative humidity is determined from psychrometric readings and wind velocities obtained from cup-anemometers.

The fire behavior factors applying in the various sections of the country have been integrated into a sliding scale from which numerical values of "Fire Danger Ratings" are obtained. Some variations are in use in different portions of the country but generally five to seven fire danger ratings are in use. These danger classes vary from class 1, described as a condition when fires will not spread beyond the heat of a campfire or burning brush, through class 4 or moderate condition when fires start readily from a match, burn briskly and tend to spread rapidly, to class 7 or extreme condition, when fires start readily from sparks, burn fiercely, crown and spot generally and are all but uncontrollable.

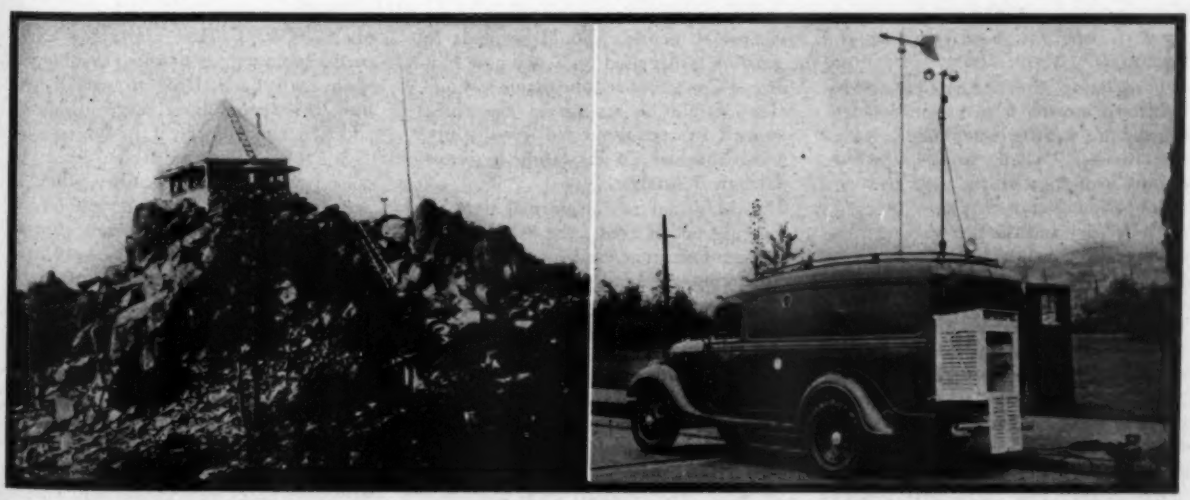
These fire danger ratings are used as guide to presuppression action in the various forest subdivisions. Recommended action for each class of fire danger is predetermined for each ranger district and the action taken varies from putting up lookouts and restricting smoking and campfires to closing forested areas, hiring crews and moving them to strategic points in the forests.

Many forested areas of the country have been divided into Fire Weather Districts, and the Weather Bureau has assigned meteorologists to each district. Fire Weather Service is given from Weather Bureau Offices at Asheville, North Carolina; Boston; Chicago; Missoula, Montana; Boise, Idaho; Seattle, Washington; Portland, Oregon; Mt. Shasta, San Francisco, and Los Angles, California.

A network of weather stations is maintained in the forested areas of each district. These stations are equipped with anemometers, psychrometers, rain gauges, fuel moisture sticks and balances, and, at a few points, with hygro-thermographs and maximum and minimum thermometers.

During the fire seasons, three observations are made daily at each station, and selected stations telegraph or radio their observations to the Weather Bureau meteorologist in charge of the Fire Weather district. This information is plotted and the meteorologist is able to determine the prevailing fire danger over his entire district.

In addition to reports from the Fire Weather stations, surface and upper-air data from the regular Weather Bureau stations over the entire country are available, and forecasts of weather conditions to be expected in the forested areas during the next 48 hours are made. These forecasts are telegraphed or radioed to key fire control men throughout the district, and enable foresters to anticipate the fire danger ratings for the following two days and prepare for whatever action is indicated under the circumstances.



LEFT—A fire lookout post in the Northwest. . . . RIGHT—Weather Bureau mobile forecast unit (U. S. Weather Bureau photos)

The data recorded by the fire weather stations are necessary for making fire weather forecasts, and, in summarized form are useful in allocating and justifying the expenditure of fire protection funds.

The system of rating fire danger is useful and necessary before a fire starts, but once the fire is under way, the forecasts made by the Weather Bureau fire weather forecasters become of prime importance. The fire boss then wants to know: first—what the wind direction and velocity will be for the next few days; second—will it rain, and if so, when; and third—what relative humidity will prevail. He also wants to know whether lightning storms are likely to develop to cause additional fire hazard. The answers to these questions will give the fire boss information as to the direction and rate of spread of the fire, the likelihood of other fires developing and whether it is advisable to expend enough time and money to put the fire out or to just hold it, and let the rain put it out, providing, of course, that rain is likely.

Because of inaccessibility, the frequency of large fires and the lack of communications in some of the western forests under protection, the Weather Bureau maintains Mobile Fire Weather Units at Missoula, Montana, Seattle, Washington, Portland, Oregon, Mt. Shasta and Los Angeles, California. These units are light trucks, equipped with radio transmitters and receivers, portable antennas and power generators, sleeping bags and a complete set of meteorological instruments. The units are manned by a meteorologist and a radio operator. The function of the mobile units is to take the Weather Bureau right into the forests when a large fire starts. Weather maps are drawn, forecasts are made and up-to-the-minute weather information is given to the fire boss right on the fire line.

Forecasting the occurrence of dry lightning storms is a major problem for the fire weather forecaster in western forests. These storms can set hundreds of fires over a wide area in a short period of time. When the forests are inder-dry and the fire weather forecaster predicts dry lightning storms, forestry officials often spend thousands of dollars hiring men and transporting them into the forests. The time required to get men and tools into some of the remote areas is such that under very dry conditions, the occurrence of fires must be anticipated to insure effective control.

In Southern California, federal, state, county and municipal agencies are very much concerned with forest fire control as they have learned that fires are often followed by rain-washed floods of mud across highways and into towns.

In the eastern and central portions of the country, about 98 per cent of the forest fires are man-caused. In the West, the hazard of dry lightning is feared most. Underground coal fires sometimes reach the surface and start forest fires in southeastern Ohio. During the depression, it was not uncommon for people living near the forests to set fires, thus creating fire-fighting jobs. However, practically all man-caused fires are unintentional. Most of these result from brush or refuse fires getting out of control Some are caused by the carelessness of smokers or campers. For the most part, co-operation on fire prevention from users of the forests is excellent. Some logging firms in the West even suspend operations when the humidity drops below 30 per cent during the fire season.

Much of our country has been cleared of extensive forests. Fire protection agencies are numerous, well equipped, and manned with trained personnel. The science of predicting fire weather is being perfected—but forest fires still occur. Modern conservation policies and selective logging practices are restoring some of our once luxurious forests, which makes it imperative that the people of this country should become more forest-fire-conscious and make every effort to erase that "98 per cent man-caused" fire figure.

The time required for Mother Nature to grow a fair-sized pine tree varies from about 150 years in the Northern Rockies to about 40 years in the Southern Gulf States. A crop of trees representing years of growing can be destroyed in a few hours by the carelessness of one smoker or camper. So when you enjoy the recreation offered by the woodlands, abide by the well-known Forest Service slogan *"Chaperone Your Fire—Don't Let It Go Out Alone."*

Mill Lubrication . . .

(continued from page 53)

by the mill can be added. For example: On the card for "Wet end—all grease lubricated bearings," we have not shown the number of fittings. This can be best be done at the mill by the lubrication man actually checking the number of fittings two or three times to make sure that he has completed all of them. Then this number of fittings can be added to the cards. One suggestion is that the lubricator actually carry along with him a hand counter to be punched every time a point is lubricated and thus give him a record when he is finished to assure him that all points have been lubricated.

Special mention should be made regarding cards used on a machine having a Continuous Lubrication System. This would be set up in the three-month frequency period group, on a card indexed "Lubrication System—Chemical Analysis."

In addition to the normal data appearing on all cards, the "Comments" column of this card is divided into four columns headed A, B, C, and D. Complete information on this card identifies the heading as A—Acidity, B—Water per cent, C—Sludge, D—General condition, and advises to check these items during each frequency period. In addition, it is recommended that a sample of the oil be obtained and placed in a slender glass bottle to be kept on a wooden rack, period by period, for comparison. The first sample on the rack would be the new oil as it is placed in the machine. By comparison, period by period, it readily can be checked to see if the condition of the oil is deteriorating. All such information appears on the cards, thus assuring accurate and understandable instructions for efficient lubricating.

For each machine, a number of cards are included for such items as gear motors, gear units and other equipment which normally is purchased for use on the machine. The mill should record on these cards the manufacturer's lubrication instructions for the specific unit. If accurate data is not available, it should be secured by contacting the various manufacturers.

There are additional pockets in each of the Kardex Book Units for extra cards, and a supply of cards is included with each Book Unit to permit the mill to expand the record to cover additional machinery if it desires.

We have described this system in considerabdle detail because, while it accomplishes such a worthwhile result, it actually does so by very simple means. The cards and folders are neat and compact, easily handled, and highly efficient.

Considering the high quality and cost of paper mill equipment, and keeping in mind the desirability, especially under wartime conditions, of using all labor, materials, and equipment to their fullest capacity for production, we feel that this method of mill-equipment lubrication fills a very important need.

For Better Papermaking — *Know Printing*

A proving press should be invaluable in a paper mill laboratory

JACK BEIERWALTES

▶▶▶ ARE THE FINE PAPERMAKERS behind the times? You would probably be surprised to know the number of people in the printing trade—your real customers — who think you are. I don't believe that they consider you behind the times from the standpoint of your technical knowledge and the up-to-dateness of the materials you use, or the way in which you use them. Nor do I think that they feel you're behind the times in your ability to make good papers.

However, I do believe that they look upon you as being behind the times in your knowledge of printing and printing problems. They feel that you are inclined to look upon paper as an end in itself, rather than printing plant raw material, which it actually is.

In this respect, you suffer badly in comparison with the other trade suppliers, such as the press builders, ink makers, roller manufacturers, and the engravers, who are much better informed about printing, and the various processes and details of printing and printing problems. Not only do they feel that you have inadequate knowledge of printing, printing conditions, and printing problems, but they feel that you are inadequately equipped to test your products in the same way that the printer uses it.

The easiest and best way to learn about conditions is to go directly to the printer. Certainly many of you do this now in your trouble-shooting work. But it would seem that an exclusive diet of trouble-shooting would tend to badly distort one's view. It would be much more helpful for technical men to establish a regular contact with the printer . . . perhaps spending one week out of each three months visiting the printers, observing their conditions, and talking paper problems over with them.

It should be possible to arrange the entré with these printers through your sales department, so that you would be able to not only sit down with printing plant management and discuss paper from the standpoint of selection and economics, but also to go right into the plants and watch the paper in use on the presses and in the binderies . . . To discuss paper problems and performance with pressmen who actually have first-hand experience with the performance of the paper, with the foreman and superintendent who supervise the printing of paper and who are responsible for its use on different types of equipment.

A regular, definite contact such as this would give you a broad, general viewpoint which you would not be able to get in any other way. Such contact would not only guide you in the building of specific sheets for specific purposes, but also in the quality control of your paper manufacturing, showing in particular where to lay emphasis in your control.

Regular contact would give you a first-hand knowledge of the new developments coming into the trade and how they would affect your papers. It would enable you to understand the people using your papers. You would learn their weaknesses and strong points. You would learn the limitations of their knowledge of paper and you would also gain an appreciation of how much these people know about the successful use of paper . . . the efforts they make in running it successfully.

You would gain a first-hand knowledge of the various types of equipment on which the paper is run, for there should be considerable difference in the performance of a given sheet on different types of presses and folders.

With a definite regular contact you would also gain a knowledge of printing, printing conditions. and printing

problems first-hand that you would not be able to get by reading, listening to "experts" or in any other way.

Equipment: No one denies the fact that you have fine instruments in your laboratories by which you can measure the individual characteristics of your paper . . . instruments which you must have for the intelligent building of a sheet and its control. Undoubtedly it would be difficult to make paper without pop testing, tear testing and fold testing . . . wax testing and smear testing equipment. But it would seem that this equipment and these tests only measure the individual characteristics of a sheet separately, and one wonders if these various characteristics, measured satisfactorily, always add up to a good working sheet of paper. You have considerable need for equipment by which you can make a composite test . . . a test which would enable you to check the total of these characteristics all at once.

At least you should know more about the various types of presses. Information of this type is readily available by simply addressing a letter to each of the equipment manufacturers, requesting literature on each of the various types of presses they manufacture. This can be collected in a folder and kept on hand to not only acquaint newcomers in the laboratory with the equipment and its use in the graphic arts industry, but also for reference.

A proving press should be invaluable in a paper mill laboratory. By means of a proving press you would be able to check relative pick resistance of papers more conclusively than by means of a wax test. For we all know of cases where pick resistance of a sheet as determined by a wax test is and does not parallel the pick resistance of a paper as printed with ink. A proving press would demonstrate the receptiveness of a sheet in a manner which you would not be shown by any other method. Proofs would show whether inks would dry more glossily on one sheet than another.

Proofs also would show whether an ink would dry more flatly or with a duller finish on one sheet than another. Proofs of an overprint press varnish also would show whether one sheet assumed greater color than another and how glossily the varnish would dry on two different papers. Only by means of a proof could you get a conclusive idea as to the general printability of a sheet, whether an ink tends to chalk more easily on one sheet than another, how readily an ink would offset on each of several different papers, and will provide a good insight into the relative coverage of an ink on each of several different papers.

By the use of a proving press you would learn to evaluate proofs and prints of ink on papers, so that when a printed sheet accompanies a complaint you would be much more capable of arriving at the reasons for the dissatisfaction.

A regular production printing press, however, would be even more valuable in every one of these respects than a proof press. Such a production press should be a typical press . . . it should be installed in typical surroundings. By a typical press we mean a used press, for all presses running papers today are used. It should not be the most up-to-date press, for most of the presses today are at least several years old. Of the various types of letterpress presses, perhaps the cylinder press is the most typical.

It is true that the rotary presses run tremendous amounts of paper, but in comparison to the number of cylinder presses now in use, there aren't very many rotaries. It would seem that there are also not very many platen presses in use compared to the number of cylinder presses, nor do they run the total amount of paper that the cylinder presses print. More typical, the cylinder press should be not quite mechanically perfect, although it should be capable of doing a fairly good job. This press ought to be a little worn. It should have an automatic feeder which does not too positively control the sheet. It should have an extension delivery which also should not provide too positive sheet control. Naturally, you will want to make it as compact as possible so that it doesn't take up anymore room than is necessary.

In addition to the advantage of such a press being so typically like those used by average printers, a press meeting these specifications should be comparatively inexpensive, particularly in the postwar era for there will be a great many of these presses turned in on newer equipment which would not be quite so typical of the equipment still in use by the average printer. A press which would most likely meet all these requirements would be a used Kelly B with automatic feeder and extenesion delivery. To be typically

A press which most likely would meet all these requirements—a used Kelly B

installed, the press should be in a room with no control over the humidity and not too close control over the temperature. The pressroom should be dry and hot in the winter and humid and hot in the late spring and summer months. Such a press, installed under such conditions, should give you a good idea of how your papers perform in the average printing shop. It will show you everything that a handproof press will and to a much greater degree. It will show you how your papers perform on a somewhat older type of automatic feeder and extension delivery.

The knowledge you would gain from the use of such a press would be a tremendous help to you not only in building your papers for specific purposes, but also in the uniformity control of your papers. It should not be too difficult to even go so far as to make some runs of each mill-run of paper. For this, of course, a typical automatic folder also would be of considerable help.

Perhaps many of you for a long time have had ideas similar to these in mind. Perhaps even some of you have gone so far as to mention it to your management with anything but enthusiastic results. Undoubtedly most of you feel that your management should trust your judgment and know that you would not make a frivolous request involving any amount of money for such purposes. Perhaps you feel that the need and reasons for such a mill program are so evident that involved persuasion is not necessary, for if management doesn't see it, that's its responsibility.

On the other hand, maybe our management knows us as human beings—susceptible to error. Perhaps many of us have been told at one time or another that we are expected to make mistakes, although, of course, not the same mistake more than once or possibly twice. So despite our technical knowledge, management undoubtedly looks upon a paper technician as a human being who is capable of making mistakes, both in operation and in judgment. Then, too, because you are convinced that such a program would be of help to you and your mill (and you undoubtedly know many reasons why it would be) then perhaps you just assume that your management is equally well informed. But does your management know all of these reasons which are so familiar to you? In view of all this, it would seem that simply suggesting to your management that you need a thousand dollars or so to buy a press, and the authority to go out and see a printer once in a while, would not be all that is necessary to demonstrate the need for such a program of getting the results you desire. A real selling job is required!

Information of this type is readily available

Perhaps the first step to such an end would be a little study of human relations. As a technical man, you have undoubtedly devoted the greatest share of your time and effort to the study of the details of papermaking, finding little or no time for the study of human relations. In view of this, maybe paper technicians would find the following books not only of considerable help to them, but also extremely interesting.

How to Win Friends and Influence People, Carnegie.

How America Lives, Furnas.

Art of Persuading People, Worsham.

Technique of Handling People, Laird.

If such a program is to be brought about in paper mills, undoubtedly a complete presentation must be worked out. The presentation should be worked out in terms of *You,* Mr. Manager. What it will do for *You.* How it will help *You* and show greater profits and increase the prestige of the mill and its future earnings. How it will reduce complaints . . . and all of the other advantages of such a program.

Completeness of the presentation should also indicate that no pitfalls have been overlooked. Being allowed to carry through with such a program it might also be of considerable help to enlist the support of the other departments effected by the program.

The first one which comes to mind would be sales. It would seem that the sales department would greatly relish being able to tell the trade, the jobbers, and in turn the printers that is technical men knowing printing, printing conditions, and printing problems, and know how to build papers to overcome those problems or at least minimize them. It would seem that sales could make most effective use of the fact that the technical department in its mill is equipped with standard typical production press equipment and that the papers they offer have already proven their ability for satisfactory performance on a press. That sales *knows* that those papers, even before they leave the mill, will run smoothly and produce good printing. In return for such an argument, it would seem that the mill sales executives would be more than willing to lend their weight to the support of such a program.

If the support of these other departments is enlisted that should be of invaluable help in convincing management of the need for such a program. It would be wise to keep the presentation as impersonal as possible so that it will not be confused with some pet projects over which the laboratory is currently enthused.

Therefore, to intelligently analyze the printing problems of his papers from the standpoint of the printer, the paper technician must go to the printer by means of a definitely established contact policy. He must acquire the equipment and knowledge by which he can make composite tests of his papers.

If such a program is to be carried through, of course, management must be convinced of its necessity and the need for such persuasion not be overlooked.

Paper SKETCHES . . . . . .

NEARLY 36,000,000 POUNDS OF WASTE PAPER WERE COLLECTED BY THE ELEMENTARY SCHOOL CHILDREN OF CHICAGO DURING THE YEAR ENDING FEBRUARY 16, 1945.

IN AN EFFORT TO DEVELOP PAPER THAT WOULD RESIST THE RAVAGES OF INSECTS OF THE WEST INDIES, THE SOCIETY OF SCIENCE OF PHILADELPHIA, IN 1786, OFFERED A PRIZE FOR A SUCCESSFUL PROCESS.

DRYERS FOR FOURDRINIER AND DICKINSON CYLINDER PAPERMAKING MACHINES WERE INVENTED IN 1821 BY T. B. CROMPTON.

THE SURFACES OF 16th CENTURY PAPER WERE SO ROUGH AND HARD THAT SHEETS USUALLY HAD TO BE SOFTENED BY DAMPENING BEFORE FIT TO TAKE IMPRESSIONS FROM DELICATE WOODCUTS.

KELGIN LV

For gloss ink sizing and the preparation of paper board for wax coatings, KELGIN LV is a welcome newcomer to this industry.

KELGIN LV dissolves quickly in hot or cold water and is adaptable to water box application on the calendar stacks. It is achieving extraordinary savings in various applications. It may be of great service to you.

We invite your inquiries and offer our Technical Department's full cooperation in your commercial application of KELGIN LV.

KELCO COMPANY

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ALLIED

GENERAL PRINTING INK ACQUIRES E. J. KELLY CO. AND LABORATORIES

Acquisition of the E. J. Kelly Company and the Michigan Research Laboratories, Kalamazoo, Michigan, by the General Printing Ink Corporation, New York, has just been announced.

The E. J. Kelly Company and Michigan Research Laboratories will retain their identity and will function as a wholly-owned subsidiary of the General Printing Ink Corporation. Thomas J. Craig, formerly chief of the Protective Coatings Branch, Chemicals Bureau of the WPB, and more recently associated with the George H. Morrill Company, Division of General Printing Ink Corporation, will be resident manager of the two Kalamazoo firms.

◆

▶▶▶ THE FACILITIES formerly occupied by the Hunter Manufacturing Company at Croydon, Pennsylvania, have been leased by Philco Corporation, of Philadelphia. The new plant will be used to take care of the export packing of spare parts for radio and electronic equipment made in its Philadelphia plants for the Army and Navy. Approximately 200 employees will be required for the work at Croydon.

◆

NEW OFFICE CREATED BY ELLIOTT COMPANY

Creation of the office of engineering vice president, and additional responsibilities for other executive officers were announced by the Elliott Company, Jeannette, Pennsylvania, following the company's annual meeting on March 28.

W. A. Elliott, vice president in charge of sales, was elected executive vice president. Ronald B. Smith, manager of engineering research and development, was elected vice president in charge of engineering. M. G. Shevchik, secretary, was made secretary-treasurer. Grant B. Shipley, board chairman and president, and R. W. Owens, vice president in charge of manufacturing, were re-elected. F. W. Dohring, general sales manager, was given added responsibilities as assistant to the executive vice president.

◆

▶▶▶ A COMPLETE LINE of urea formaldhyde and phenol formaldehyde resins is now offered by Wilmington Chemical Corporation, 10 East 40th Street, New York City, in collaboration with the Synvar Corporation, Wilmington, Delaware. Present products include standard resins in liquid and powder form for a wide range of applications, as well as specially-developed products for specific end uses. Thermoplastic type resins will also be available in the near future.

◆

ARMCO SPIRAL PIPE WILL BE SOLD THROUGH PARENT CO. SUBSIDIARY

The American Rolling Mill Company, Middletown, Ohio, has announced that Armco Spiral Welded Pipe will be sold through Armco Drainage & Metal Products, Inc., Middletown, a wholly-owned subsidiary of the parent company. The new commercial arrangement consolidates all Armco pipe and fabricated product activities in one organization.

R. C. Beam has been named manager of the Welded Pipe Sales Division of Armco Drainage & Metal Products, Inc. He formerly headed the Pipe Sales Division of the parent company. R. E. Walker, who has been appointed district manager of Welded Pipe Sales, will continue to be located in Tulsa, Oklahoma. Division offices of Armco Drainage & Metal Products, Inc., are now maintained in principal cities throughout the country.

◆

WESTINGHOUSE PROVES SUGGESTION SYSTEM OPERATES PROFITABLY

In the annual report on its suggestion system, Westinghouse Electric and Manufacturing Company states ideas of workers in the company's war plants saved the war effort $1,765,059 in labor and material costs on armament production in 1944 by suggesting new and better ways of doing things.

Out of the 38,709 war production suggestions turned in, the suggestion committees in the different plants approved 14,867 and put them to work to speed the war effor.

◆

▶▶▶ BASIC PATENTS covering electronic vulcanization of rubber and other materials have been purchased by The B. F. Goodrich Company and The Firestone Tire & Rubber Company. The patents were originally granted on discoveries made by R. A. Dufour and H. A. Leduc of France, and by E. E. W. Kassner, of Switzerland.

◆

▶▶▶ NEW YORK OFFICES have been opened for A. O. Smith Corporation's International Division. A. E. Cripps, newly-appointed eastern supervisor, is in charge of the offices which are in the Commerce Building. In addition to the company's export activities in New York, Mr. Cripps also will supervise its lend-lease and foreign government business in Washington. The company is located in Milwaukee, Wisconsin.

REPAIR EQUIPMENT BUILT FOR THE NAVY

A floating steel dry dock being towed away from the Chicago Bridge & Iron Company's yard at Eureka, California, where it was built for the Navy (Official U. S. Navy photo)

"GO EASY WITH THE HEAT!"
It takes about a bucketful of sap and a lot of cooking to make a cupful of maple syrup. But if the heat is too great or if it is continued one little minute too long the syrup is changed into a brittle mass of crystals. » » It takes about 100 tons of water to make one ton of paper. Therefore, it is common sense to rely upon suction at the wet end and pressure at the felt to reduce the load upon the drier rolls. Too much heat makes brittle paper. » » Here is where Hamilton Felts demonstrate their superiority. Hamilton Felts are so constructed that they carry off more water in less time. This, of course, means less broke and higher speed. Even more important is the reduction in the heat needed to complete the drying operation without "crystallizing" the finished product . . . And this obviously means better paper at lower cost.
• From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

•
Miami Woolen Mills
•

Hamilton Felts

•
Established 1858
•

ASSOCIATIONS

CHICAGO PRO CLUB HEARS THREE SPEAKERS FROM HERCULES POWDER CO.

Those who attended the March 19 meeting of the Professional Paper Group, held at the Chicago Bar Association, Chicago, had the privilege of listening to a timely discussion and to participate in a quiz session with three speakers from the Hercules Powder Company.

L. P. Killilea, representative of the Naval Stores Department, explained the history and functions of that department, covering in detail the rosin manufacturing procedure, normal output, and the present production difficulties which necessitated the innovation of WPB Order M-387 placing a restriction on the use of rosin in all forms.

P. L. Lefebvre, district manager of the Synthetic Resins Department, explained the uses and qualities of numerous products developed by that department in the past five years, touching principally on Abalyn and Hercolyn as transparency agents, and mentioned the use of Abalyn as a depitching agent. Stabelite and Stabelite Ester 10 and its wax coating uses were explained. The potential possibilities of Neolines and their characteristics were discussed.

F. K. Shankweiler, Cellulose Products Department, outlined the developments of nitrocellulose, ethyl cellulose and Parlon as coating materials which have greatly enhanced various paper characteristics when properly applied.

The question and answer program which followed the discussion was of special interest at this time.

◆

TINKER POINTS OUT NEED FOR CONTINUED WOOD PULP ECONOMY

In commenting upon the outlook for the pulp and paper industry after V-E Day, E. W. Tinker, Executive Secretary of the American Paper and Pulp Association, has stated that there is a grave danger of over-optimism with respect to augmented supplies. A very heavy demand is anticipated to bring inventories back to normal and to meet known enlarged requirements. There appears to be no immediate possibility of obtaining sufficient woods labor to bring woods supplies back to normal and the pulp requirements of the paper industry will no doubt continue to be greatly curtailed.

There is a possibility of some foreign pulp reaching the domestic market, but in view of anticipated heavy demands in Europe, the full available inventory in Scandinavia cannot be looked upon as a potential supply for the domestic market.

Continued pressure to augment available woods supply from every source is necessary, as well as a continued effort looking to maximum salvage of waste paper.

◆

CHICAGO PACKAGING CLUB

A new group known as The Chicago Packaging Club recently was formed for the purpose of bringing together and co-ordinating the many separate factors necessary for proper packaging and shipping.

Regular luncheon meetings of the Club are held on the second and fourth Mondays of each month at the Builders Club, 228 North LaSalle Street. The basic purpose of the Club is to bring together at regular meetings producers of packaging materials, packaging designers and engineers, producers of machinery and supplies for packaging or package handling, users of packaging and packing, and other related interests such as railroads, truckers, airlines and other carriers.

◆

NAM PATENTS COMM. CHAIRMAN DECRIES HIGH COST PATENT LAW SUITS

The high cost of patent law suits is viewed as a serious handicap to the creation of postwar jobs by R. J. Dearborn, chairman of the Patents Committee of the National Association of Manufacturers.

Mr. Dearborn states that America is on the threshold of its greatest era of technological advance. New inventions will create new products and processes which will provide employment for many in the postwar period.

One method of lessening this evil, Mr. Dearborn believes, is to reduce the number of invalid patents issued.

◆

CANADIAN P&P ASS'N APPOINTS ROBT. MAC LAREN FOWLER FULL-TIME PRESIDENT

The appointment of Robert MacLaren Fowler, of Toronto, as president of the Canadian Pulp and Paper Association, and of A. E. Cadman, secretary of the Association for the past fifteen years, as general manager, has been announced by R. L. Weldon, chairman of the Association.

The post of president on a full-time basis is a new one for the Association, made necessary by the expansion of its activities. Formerly secretary and general counsel of the Wartime Prices and Trade Board, Mr. Fowler has resigned from that position. His acceptance of the pulp and paper appointment did not take place until after discussions between Association representatives and Donald Gordon, chairman of the W.P.T.B.

◆

ANNUAL MEETING OF THE SUPERINTENDENTS ASS'N HAS BEEN CANCELLED

In compliance with order of the Office of Defense Transportation, the annual meeting of the American Pulp and Paper Mill Superintendents Association has been cancelled.

The meeting had been scheduled for June 5-7 at the Commodore Hotel, New York City. There will be a meeting of the Trustees and a brief meeting for members June 8-9 at the Commodore.

◆

COMING EVENTS

May 5—Annual Ladies Night, Michigan Division of the American Pulp and Paper Mill Superintendents Association, at the Park American Hotel, Kalamazoo, Michigan.

May 11-12—Spring meeting of the Maine-New Hampshire group of the Technical Association of the Pulp and Paper Industry, at the Elmwood Hotel, Waterville, Maine.

June 8-9—Brief business meeting and meeting of the Trustees of the American Pulp and Paper Mill Superintendents Association, at the Commodore Hotel, New York City. (The annual meeting of the Superintendents Association, originally scheduled for June 5-7 at the Commodore Hotel, has been cancelled.)

STATED MEETINGS

Technical Associations of the Pulp and Paper Industry

Delaware Valley Section—First Friday of each month at the Engineers' Club, Philadelphia, Pa.

Empire State Section—Second Thursday of each month at the Woodruff Hotel, Watertown, New York.

Kalamazoo Valley Section—First Thursday of each month, including June, at 6:30 p. m. at the Columbia Hotel, Kalamazoo, Mich.

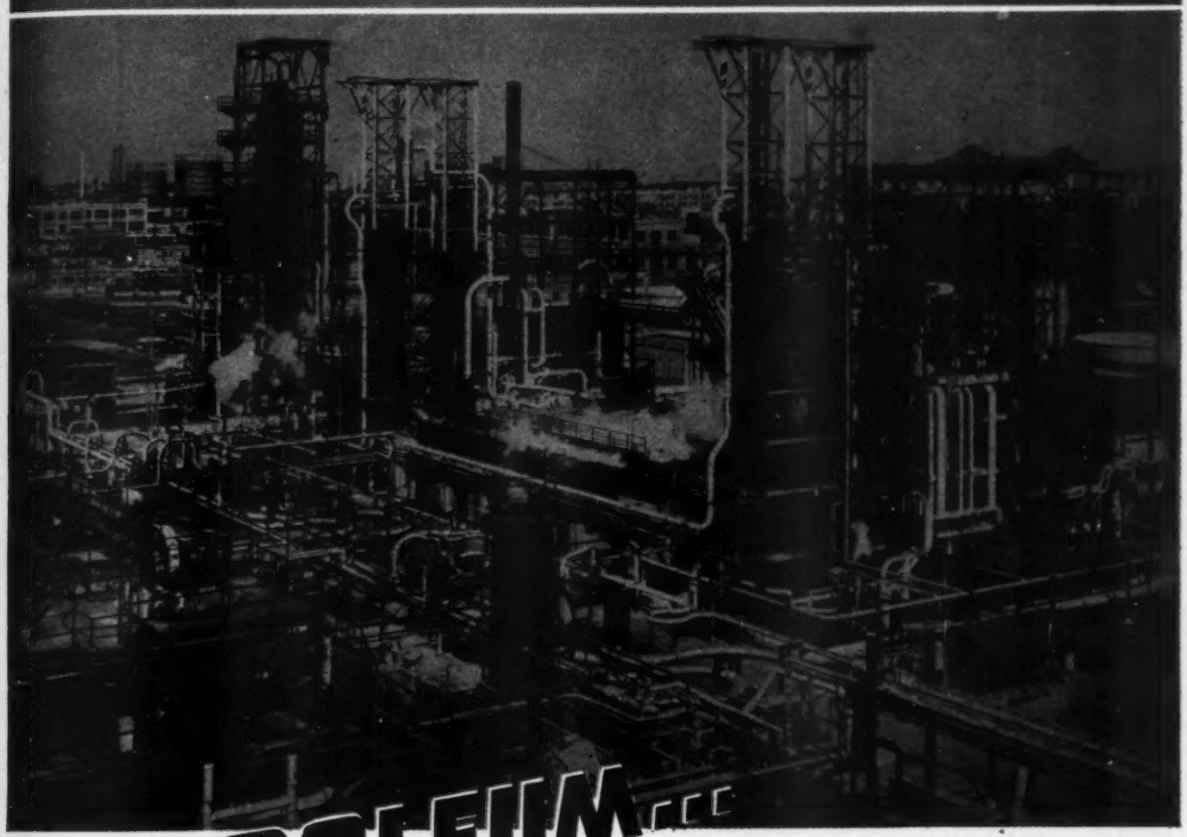
Lake States Section—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

New England Section—Third Friday of each month, at the Roger Smith Hotel, Holyoke, Mass.

Chicago Professional Paper Group

The third Monday of each month at Chicago Bar Association, Chicago.

American industry flows through fairbanks valves



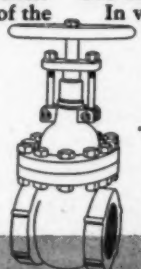
PETROLEUM

super-servant of industry

In fantastic mazes of piping and tanks . . . in silvery towers and glistening spheres . . . petroleum is broken down to serve industry with an almost unbelievable variety of products and ingredients. Its versatility appears limitless. What other man-perfected gift of nature, for example, can fuel a vehicle, lubricate it, and supply the synthetic for its smooth-running tires?

Operations must run smoothly in every phase of the oil processing industries in which petro-chemistry has scored so many technological advances. Close control of the flow of liquids and gases is all-important and accounts for the unusual care with which valves for such pipelines must be selected.

"American industry flows through Fairbanks valves", and wide refinery use affords a good illustration. One type serving the oil and gas fields is the iron body bronze-mounted gate valve below. Other Fairbanks valves recommended for use in the petroleum industries as well as on steam, gas, water and process liquid lines in all industries are all-iron gate valves as well as bronze valves in gate, globe, angle, and check types.



In valves as in all heavy-duty equipment, there's no substitute for substantially-built units made to close tolerances from metals that are rigidly controlled. There's no substitute for experience such as Fairbanks has gained over its fifty year span of service. For your reference files, write for a Fairbanks Catalog 42, which gives specifications and prices. With it, we'll send nearest distributor's name.

THE fairbanks COMPANY

393 LAFAYETTE STREET, NEW YORK 3, N. Y.

320 Atlantic Ave., Boston 10, Mass. 748 M & M Bldg., Houston 2, Texas 15 Ferry St., Pittsburgh 22, Pa.

THE

SMITH & WINCHESTER MFG. CO.

• Since 1828 •

continuously
we have served the

PAPER INDUSTRY

with the finest in

PAPER MILL MACHINERY

During the progress of World War II, our plant and facilities have been devoted primarily to the war effort.

Replacements, or repairs to your machines, can be furnished under required priority rating.

"Undercut" Trimmers
Paper Bag Machinery
"Rainstorm" Shower Pipes
Stuff Pumps — Jordans

—Office and Plant—
South Windham, Conn.

SAFETY

EATON PAPER CORP. AWARDED CERTIFICATE FOR SAFETY RECORD

Lewis E. MacBrayne, of Boston, New England director of the national committee for the conservation of manpower in war industries, has presented a certificate of safety achievement to the Eaton Paper Corporation, of Pittsfield, Massachusetts. The company made a perfect record over a six-month period, reducing its lost-time frequency from 6.5 to 0.

In presenting the certificate. Mr. MacBrayne reported that in New England alone the efforts of the safety committee had brought increases in production amounting to 100,000 days during the past year. He listed meat packing, paper and pulp, and woodworking as three production groups that had run into bottlenecks in producing supplies for the Armed Forces, and reported that in the paper and pulp group there is now a definite downward trend in accidents.

◆

▶▶▶ THE THIRD INDUSTRY-WIDE accident prevention campaign launched by the Department of Labor in recent months will be carried on in the planing mill and wooden container industry. The campaign conducted among pulp and paper mills was the second such contest conducted by the Department of Labor.

◆

SAFETY SCORES

▶▶▶ PERFECT SCORES are recorded for eleven mills at the close of February, the tenth month in the 1944-45 Paper Industry Safety Contest. The following list of mills have a perfect record:

Division I—Pulp and Paper Mills

Groups A and B (None)

Group C

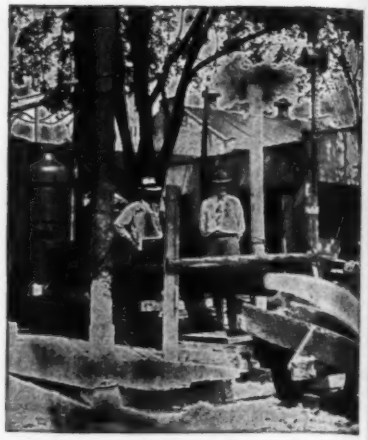
Container Corp. of America, Carthage, Ind.

Grade D

Marathon Corp. (Ashland Div.)
Certain-teed Product Corp., Buffalo.
Strathmore Paper Co. (Woronoco Mill No. 1), West Springfield, Mass.
Central Fiber Products Co., Denver.
E. I. du Pont de Nemours & Co., Newhall, Wilmington, Del.

Division II—Paper and Board Remanufacturing

Ft. Wayne Corr. Paper Co., Chicago.
Bird & Son, Inc. (Roofing Plant), Shreveport, La.
Thilmany Pulp & Paper Co. (Bag Mill), Kaukauna, Wis.
Iowa Fibre Box Co., Keokuk, Iowa.
Bay West Paper Co., Green Bay, Wis.



"Good Makings"
Make a Good Water System

You can always put your utmost confidence in a Layne Well Water System. Everything from the method used in drilling and finishing the well to the design, manufacture and installation of the pump can be trusted for highest efficiency, most durable quality and the longest life of service.

Shown above is a system recently completed for a major food manufacturer. Running true to Layne form, this system out performs its guarantee, producing nearly twice as much water as other wells in the same locality. This manufacturer knew what to expect. He already owns four other Layne Well Water Systems, all of which have always given outstanding service. He knows how little it costs to operate Layne Systems, how much water these systems produce and how small the upkeep cost.

Layne is already in postwar work. Many postwar installations are now being made. Others will soon be started. All will be of the world famous Layne quality.

If you need more water, either from entirely new wells and pumps, or from efficiently modernized old ones, write, wire or phone for the planning and estimating services of a Layne engineer. No obligation. Address Layne & Bowler, Inc., General Offices, Memphis 8, Tenn.

LAYNE PUMPS — fulfill every need for producing large quantities of water at low cost from wells, streams, mines or reservoirs. Send for literature.

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. * Layne-Atlantic Co., Norfolk, Va. * Layne-Central Co., Memphis, Tenn. * Layne-Northern Co., Mishawaka, Ind. * Layne-Louisiana Co., Lake Charles, La. * Louisiana Well Co., Monroe, La. * Layne-New York Co., New York City * Layne-Northwest Co., Milwaukee, Wis. * Layne-Ohio Co., Columbus, Ohio * Layne-Texas Co., Houston, Texas * Layne-Western Co., Kansas City, Mo. * Layne-Western Co. of Minnesota, Minneapolis, Minn. * International Water Supply Ltd., London, Ontario, Canada * Layne-Hispano Americana, S. A., Mexico, D. F.

LAYNE

WELL WATER SYSTEMS
VERTICAL TURBINE PUMPS

RASCHIG RINGS

of PORCELAIN • STONEWARE • CARBON • STEEL

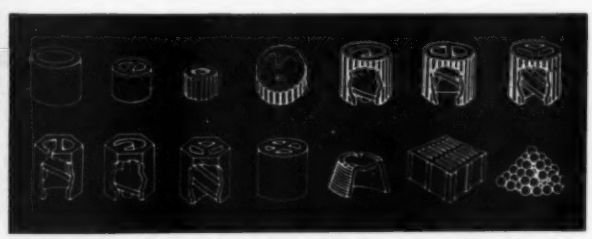
"U. S. Stoneware" raschig rings are available for prompt shipment in all standard sizes from ¼" O.D. up. "U. S. Stoneware" rings are made in four materials, each designed to fit specific processing requirements:

White Porcelain Rings: Characterized by zero-porosity, high chemical purity, great mechanical strength. Cannot contaminate any solution. Unaffected by any acids except hydrofluoric.

Chemical Stoneware Rings: Non-porous, non-absorbent, contain no soluble organic filler. Thin-walled, triple strength construction. Dense, granite-like structure will withstand high crushing stress. Inert to the action of all acids, solvents, gases (except hydrofluoric) in any concentration.

Carbon Rings: For use with hot caustics, mixtures of hydrofluoric and sulphuric, or hydrofluoric and phosphoric acids. Rings are all carbon, with no soluble bond. Light in weight (20% to 30% less than chemical stoneware).

Steel or Alloy Rings: For high temperature reactions, and for hot caustic soda solutions. Thin-walled, lightweight, butted construction. Can be made in any metal.



U. S. Stoneware manufactures more than 15 different styles and types of tower packing, each offering individual characteristics to meet highly specific needs.

THIS NEW FREE BOOKLET GIVES THE ANSWERS TO QUESTIONS LIKE THESE

What's the per cent of free gas space of a 1" raschig ring?
How many square feet of exposed absorption surface per cubic foot?
What's the relative scrubbing capacity?
How can we reduce the resistance to gas flow?

For the answers to these and to innumerable other questions about tower packing and tower construction, write for a free copy of our new authoritative booklet—"Tower Packing." Address your requests to Department P. The U. S. Stoneware Company, Akron 9, Ohio.

Now! **RASCHIG RINGS FROM CERATHERM**
the new heat-shock resistant stoneware

For tower operations involving high heat, or repeated and severe thermal shocks, raschig rings of Ceratherm, U. S. Stoneware's remarkable new ceramic body, are ideal. Ceratherm rings will not chip, crack, or spall even under rapid heating and cooling. 27% stronger mechanically than ordinary stoneware — 400% greater heat conductivity. Non-porous, non-absorbent.

U. S. STONEWARE

Since 1865 • Akron, Ohio

IN CANADA: CHAMBERLAIN ENGINEERING, LTD., MONTREAL

NAMES in the NEWS

Personals

E. A. THROCKMORTON MADE A VICE PRESIDENT OF THE CONTAINER CORP.

At a meeting of the board of directors of the Container Corporation of America, on April 2, Edgerton A. Throckmorton was made a vice president.

Mr. Throckmorton has been active in many phases of the company's business; at various times he has been sales

E. A. Throckmorton

manager, stock box division; special representative; sales promotion manager; and director of sales research. He has been an employee of the company for over 15 years, having joined the staff of the Sefton Manufacturing Corporation in 1929, approximate a year before its incorporation with the Container Corporation of America.

◆

HOBERG DIVIDES ITS TECHNICAL DEPARTMENT INTO TWO SECTIONS

A reorganization of its Technical Department has been effected by Hoberg Paper Mills, Green Bay, Wisconsin, since January 1. The first of the year, Dr. John Weidner, former technical director in charge of research and control, resigned that position.

The company now announces that the work of its Technical Department has been divided into two sections, "Control" and "Development." The Control section is now under the direction of Francis J. Allard, and Milton A. Lefebvre has charge of all activities and personnel in the Development section.

Mr. Allard has ben in the company's main laboratory since 1937; prior to that he was in Division "A" of the plant for four years. He has done considerable work with improving testing methods, analyzing and evaluating new chemicals used for wet strength, defoaming, absorbency, creping, etc. He has been a supervisor in this capacity for the past two years.

Mr. Lefebvre who heads the Development section, has been with the company for some time. His work has been concerned with the mechanical phase of the work, such as wet strength toweling, new crepe process, and instrument development.

◆

FARREL-BIRMINGHAM CO. ELECTS NEW OFFICERS

At the annual meeting of the board of directors of Farrel-Birmingham Company, Inc., held at Ansonia, Connecticut, on March 15, Franklin Farrel, Jr., resigned as chairman of the board, and Alton Austin Cheney, of Plandome, New York, was elected to succeed him.

Franklin Farrel, Jr., is the grandson of Almon Farrel, and the son of Franklin Farrel, Sr., founders of Farrel Foundry and Machine Company, which was started in Ansonia in 1849. Mr. Farrel has been affiliated with the company since 1903, and has served on the board since 1904. He will continue as a director and as chairman of the finance committee.

Alton Austin Cheney, the new board chairman, is also a direct descendant of the company's founders, being a great grandson of Franklin Farrel, Sr. He has been a director of Farrel-Birmingham since 1931.

Lester D. Chirgwin, general manager of the company's Buffalo plant, was electer vice president in charge of manufacturing, and Franklin Farrel III, plant manager, Ansonia-Derby plants, was elected secretary and assistant treasurer. Other officers reelected were Franklin R. Hoadley, president; Carl Hitchcock, Armin Kessler, and Austin Kuhns, vice presidents; and Franklin M. Drew, Jr., treasurer and assistant secretary.

Carl F. Schnuck, chief engineer of the company, and William M. Fraser, general manager of The Atwood Machine Company, Stonington, Connecticut, recently acquired by Farrel-Birmingham, were elected directors.

◆

FRED BOYCE REMAINS AS PRESIDENT OF THE D. J. MURRAY COMPANY

Fred C. Boyce, Wauwatosa, Wisconsin, was re-elected president of the D. J. Murray Manufacturing Company, Wausau, Wisconsin, at the annual meeting on March 21. Other officers elected were: M. P. McCul-

Fred C. Boyce

lough, Chicago, vice president; C. E. Staky, executive vice president and general manager; A. W. Plier, secretary; and J. S. Alexander, treasurer. The last three are residents of Wausau. Directors elected include the officers named, D. C. Everest, George L. Ruder, and Grover Keith, all of Wausau.

At the annual meeting it was reported that the company's postwar planning includes a number of new items and improved equipment for the pulp and paper industry.

◆

LUNKENHEIMER ELECTS

At the annual meeting of The Lunkenheimer Company, Cincinnati, held March 13, the following officers and directors were elected: Frank P. Rhame, president and general manager; Homer E. Lunken, first vice president and assistant general man-

(continued on page 72)

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April, 1945

Playing an active part in

EVERY STAGE of PRODUCTION

Headliners of the conveyor industry. Smooth performance built right into each part . . . the same rules that govern original Jeffrey equipment. Common sense dictates "curtain calls" for Jeffrey parts when replacement becomes necessary. We show just a few . . . more are waiting in the wings.

THE JEFFREY MANUFACTURING COMPANY

ESTABLISHED 1877

944-99 North Fourth St., Columbus 16, Ohio

CHALLENGE
TO COLORISTS
In these days when the usual materials are not always available, do you have trouble getting color uniformity? . . . What about the choice of dyes—the most economical application? And in addition, there is the problem of planning ahead for the greater use of colored papers that normal times will demand.
Meeting current problems like these poses a series of challenges to colorists. And ready to act as dependable "seconds" are Du Pont's Laboratories and Technical Staff with a fund of up-to-date information.
E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Division, Wilmington 98, Delaware.
Du Pont Dyestuffs
DU PONT DYESTUFFS
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

1945

14 WAYS TO INCREASE PROFIT

WESTINGHOUSE SECTIONAL DRIVES GIVE YOU ALL 14

For better paper quality

1. Accurate maintenance of machine speed.
2. Uniform maintenance of draw between sections.
3. Correct indication of section loads and machine conditions at all times.
4. Freedom from dirt, grease and oil.

For better operating efficiency

5. Less outage time for washing up, changing wires and machine clothing and making other machine adjustments.
6. Reduction of outage time for drive maintenance.
7. Reduction of off-quality paper.
8. Better accessibility and improved working conditions — improved crew efficiency.

For lower operating cost

9. Elimination of line and countershafting, belts and open gearing, with consequent saving in power cost.
10. Reduction of oil and lubrication requirements.
11. Longer wire and clothing life.
12. Reduction in maintenance requirements of both paper machine parts and drive equipment.
13. Reduction in fire hazard.
14. Saving in floor space, both back of the machine and in the basement.

Check the list at the left against your own operating experience.

When you specify a Westinghouse Sectional Motor Drive, you are assured of the best results. This drive is designed and built to meet the requirements of *your* particular machine.

It makes no difference what class of paper you have in mind; what size, type or speed of the machine, there is a Westinghouse Sectional Motor Drive to meet every requirement. For complete information, write for a copy of Bulletin 3045. Or, if you prefer, phone our nearest office and ask our representative to call. There's no obligation, of course. Westinghouse Electric & Manufacturing Co., Dept. 7-N, East Pittsburgh, Pa. J-94632

WESTINGHOUSE PRESENTS
. . . JOHN CHARLES THOMAS
SUN. 2:30 EWT., NBC.
"TOP OF THE EVENING"
MON. WED. FRI. 10:15 EWT., BLUE NET.

Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

SECTIONAL MOTOR DRIVE FOR PAPER MACHINES

ager; Harry A. Burdorf, vice president, sales; Charles W. Burrage, secretary; Chester C. Isekeit, treasurer and controller.

Directors are Harry A. Burdorf, Henry G. Frost, Chester C. Isekeit, Carl M. Jacobs, Edmund P. Lunken, Homer E. Lunken, Frank P. Rhame.

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▶▶▶ At a recent meeting of the board of directors of the Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, *John Howard Collier,* president of the Crane Co., Chicago, was elected a director of the company. The Allis-Chalmers directorate post filled by Mr. Collier, was left vacant by the resignation of Captain Lester Armour, of Chicago, who has been in the Navy most of the time since the outbreak of the war.

◆

CHANGES ANNOUNCED BY AMERICAN ROLLING MILL CO.

Releases have just been issued by The American Rolling Mill Company, Middletown, Ohio, announcing the following changes in executive personnel:

Fred D. Danford, who has been assistant treasurer of the company since 1936, has been made treasurer to succeed the late M. A. Brawley, who passed away suddenly March 7.

Gordon Gage, former general superintendent of the company, has been made manager of the Butler (Pa.) Division of the company. He succeeds Harry Holiday, who resigned because of ill health. Roy P. Tooke, assistant chief of the engineering department in Middletown, goes to Butler as general superintendent.

William F. Tuttle has been appointed assistant chief engineer of the General Engineering Division of the company. Mr. Tuttle is a graduate of M.I.T. He joined the Armco organization in 1922 as engineer in the Ashland Construction Department. He was transferred to Middletown and became development engineer in 1930. That same year he became works engineer, and in December, 1944, was made assistant to the manager of the East Works plant, which position he held until his recent promotion.

◆

TWO NEW TECHNICIANS AT M AND O COMPANY

Two technicians who will aid in postwar plans for the development of new papers and paper products have joined the research department of Minnesota and Ontario Paper Company.

The two, both of whom will be stationed at M and O mills in International Falls, Minnesota, on the Canadian border, are George H. McGregor, to be in charge of pulp research; and Leo A. Willoughby, who will have charge of extension of the paper coating process from the present pilot plant stage.

George H. McGregor

Mr. McGregor is well known in the paper industry. He is now chairman of the Acid Pulping Committee of TAPPI and has held other offices in that association. He was technical director of the Pulp Division of Weyerhaeuser Timber Company and also general superintendent of that division. Mr. Willoughby was formerly associated with Oxford-Miami Paper Company, West Carrollton, Ohio, and Bryant Paper Company, Kalamazoo, Michigan. With the latter company, he served as superintendent of the coating division.

Leo A. Willoughby

HARRY ELIASON IS NOW ASST. VICE PRESIDENT OF CELLULOSE SALES CO.

The election of Harry D. Eliason as assistant vice president, has been announced by the Cellulose Sales Company, Inc., New York City.

For the past fifteen years, Mr. Eliason has represented the Cellulose Sales Company in the middlewestern states with headquarters in Kalamazoo, Michigan. Previously, he was director of production with the Detroit Sulphite Pulp and Paper Company.

◆

JAMES MADDEN PROMOTED TO THE PRESIDENCY OF HOLLINGSWORTH & WHITNEY

Personnel changes were announced by Hollingsworth & Whitney Company, Boston, following meetings of its board of directors and stockholders.

M. L. Madden, who has been president of the company since 1931, was elected chairman of the board. James L. Madden, a vice president since 1941, was made president of the company. Robert Nivison, of Winslow, Maine, was elected a vice president. Mr. Nivison has been manager of mills since 1916; he has had forty-one years of continuous service with the company. L. G. Glazier, controller since 1939, and vice president since 1941, was re-elected.

At the meeting of stockholders, H. C. Thayer was re-elected treasurer, an office he has held since November, 1927. Herbert G. Fales, of New York City, was elected a director. Other directors of the company re-elected were the above officers and Walter B. Merlin, Herman W. Vaughan, Louis Oakes, W. Elliott Pratt, Jr., and Amor Hollingsworth.

◆

▶▶▶ A new appointment is announced by the Southland Paper Mills, Inc., Lufkin, Texas. *Melvin Farris,* formerly tour boss, has been made superintendent of the kraft mill. Mr. Farris became associated with Southland when the kraft mill started up in 1944, after many years experience in the kraft industry both in the South and on the West Coast.

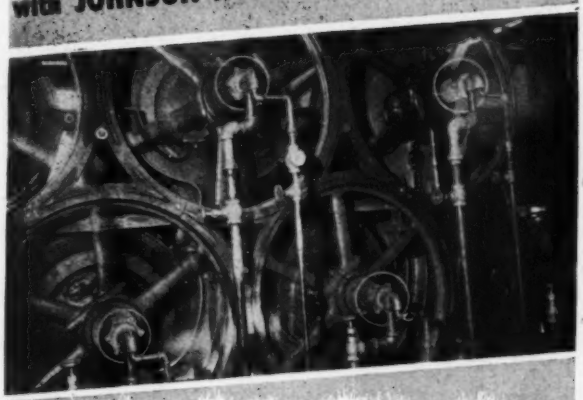
◆

▶▶▶ The election of *S. B. Heppenstall, Jr.,* as vice president has been announced by H. K. Porter Company, Inc., Pittsburgh. Mr. Heppenstall formerly was vice president in charge of sales of the Heppenstall Company.

save

manhours
production time
maintenance cost

with JOHNSON ROTARY PRESSURE JOINTS

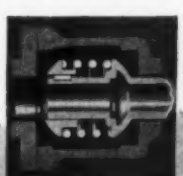


● Operating men everywhere have learned that the Johnson Joint is far more than just a better stuffing box or steam fit. It's an effective way to help solve many of your operating problems, this year and every year.

To begin with, the Johnson Joint steps up production. Its simple trouble-free design saves valuable time that is wasted when machines are shut down to repack or repair stuffing boxes. In addition, it provides a simple, neater way to install more efficient methods of syphon roll drainage.

While production goes up, maintenance costs come down. The Johnson Joint has no packing to wear out, needs no oiling or adjusting, and absorbs trouble-causing misalignment—both lateral and angular.

Reducing maintenance of course stretches your manpower—makes hard-to-get help available for more productive work. This is particularly important today. From every standpoint, you never had greater need for the Johnson Joint than you have *right now.*



Write for full information

The Johnson Corporation

845 Wood Street — Three Rivers, Mich.

NEED HOT WATER?

The simplest, quickest, most economical way to heat water with steam is with the Johnson Instant Heater. Needs no reducers; hooks right up to high pressure steam lines. Available now in lower cost, all steel construction, or for use in process work with heating chamber of copper tubes.

Complete range of sizes, capacities; write for bulletin

Beat Competition by BEATING RUST

Plan your product to be a winner . . . . in the face of keen future competition . . . . by using Harper Everlasting Fastenings—the fastenings that (1) resist rust and corrosion, (2) stand up in the presence of many acids, alkalies and other tough conditions, (3) add years of service life AT LOW COST, (4) can be removed with ordinary tools and used again and again. Every Harper fastening is made of either brass, copper, naval bronze, silicon bronze, Monel or stainless steel (nothing in common steel).

4360 ITEMS IN STOCK

Harper is known as "Headquarters for Non-Ferrous and Stainless Fastenings" . . . . carries large and complete stocks of 4360 different items and is continually adding others . . . . maintains large stocks of metals in bars, rods, wire, sheet and other basic forms from which special fastenings can be quickly made. Write for 1945 Catalog.

THE H. M. HARPER COMPANY
2647 Fletcher Street, Chicago 18, Illinois

BRANCH OFFICES: New York City • Philadelphia
Los Angeles • Milwaukee • Cincinnati • Houston
Representatives in Principal Cities

HARPER
EVERLASTING FASTENINGS

BRASS • BRONZES • COPPER
MONEL • STAINLESS

▶▶▶ Three appointments were made by the board of directors to fill offices in American Lumber & Treating Company, Chicago. Following resignation of H. B. Horton, Chicago Bridge & Iron Company, from the position of vice president and treasurer, *H. H. Humphreys* was elected secretary-treasurer. *J. Gardner Coolidge* and *Paul Wayman* were named vice presidents.

◆

▶▶▶ The B. F. Goodrich Company, Akron, Ohio, has named *Ralph W. Gordon* as manager of the Time Study and Standards Department. In this position, Mr. Gordon will render industrial engineering service to the engineering, warehousing, and other miscellaneous divisions of the Akron plants. He has been with the company since 1936.

◆

▶▶▶ The reorganization of the Columbia Paper Company, Vancouver (B. C.), has been completed with the appointment of *R. E. Miller* as president. Mr. Miller and his associates have purchased the interests of C. J. Kay and the estate of the late K. A. Smeed. Other officers of the company are *C. H. Dennis*, vice president, and *G. H. King*, secretary-treasurer.

◆

▶▶▶ With headquarters in New York City, *Howard A. Sommers* will act as chief engineer of The Mathieson Alkali Works. Mr. Sommers joined the Mathieson organization in 1925. He has held a number of important positions in the company's branches and takes over his new work after serving as the company's project engineer.

◆

▶▶▶ Until recently chief of the American Mission for Economic Affairs in London with rank of minister, *Phillip D. Reed* has been re-elected a director and chairman of the board of General Electric Company, Schenectady, New York. Mr. Reed resigned that position in January, 1943, for special government work.

◆

INCO CREATES NEW SECTIONS

Three newly created sections of the Development and Research Division of The International Nickel Company, Inc., New York City, have just been announced.

The Industrial Chemicals Section is headed by O. B. J. Fraser; the Corrosion Engineering Section is in charge of F. L. LaQue, and the Iron and Non-Ferrous Casting Section is headed by Donald J. Reese.

JOE W. GREEN MADE GEN. SALES MANAGER OF THE OHIO INJECTOR CO.

The appointment of Joe W. Greene as general sales manager has just been announced by The Ohio Injector Company, of Wadsworth, Ohio. Mr. Greene has had many years of experience in the valve field, having made headquarters in the Southwest, the Middlewest, and the East for the past twenty years, handling the oil, power and construction industries.

Some time ago the company completed its new steel valve plant, one of the most modernly equipped in the country.

◆

▶▶▶ Named to serve on the Patents Committee of the National Association of Manufacturers is *B. R. Newcomb*, president and general manager of John Waldron Corporation, New Brunswick, New Jersey.

◆

▶▶▶ Election of *Gwilym A. Price*, of Pittsburgh, and *John R. Read*, of Hamilton, Ontario, Canada, to the board of directors has been announced by Westinghouse Electric and Manufacturing Company. Mr. Price joined the company in 1943 as vice president, his responsibilities including settlement of war contracts. Mr. Read is chairman and president of the Canadian Westinghouse Company.

◆

▶▶▶ Appointed director of Business Research of The B. F. Goodrich Company, Dean E. Carson succeeds Ward Kerner, who recently became assistant to the president of the company. Mr. Carson has held various important posts in the various divisions of the company, joining the business research department in 1943. He joined the Miller Rubber Company in 1920 and became a member of the B. F. Goodrich organization in 1930 when that company was merged with B. F. Goodrich.

◆

▶▶▶ The military cross was awarded to *Captain Kenneth W. Eagan, R.C.A.*, while serving in Italy. Captain Eagan is a native of the United States, but he was educated in Montreal and was with the Anglo-Canadian Pulp and Paper Mills when he joined the Royal Canadian Artillery in 1939.

▶▶▶ The appointment of *Charles C. Cheyney* to the position of sales manager of Buffalo Forge Company, Buffalo, New York, is announced by that company. Mr. Cheyney was for a number of years Chicago representative of the company and more recently he has been assistant sales manager.

◆

▶▶▶ The Reliance Electric & Engineering Company, Cleveland, Ohio, has engaged *Robert J. Overstreet* to act as its representative in North and South Carolina and Eastern Georgia. He will make his headquarters in Greenville, South Carolina. Mr. Overstreet is a graduate of the Virginia Polytechnic Institute and was formerly employed by J. E. Sirrine, Greenville, South Carolina. He was more recently with the J. A. Jones Construction Company, Brunswick, Georgia.

◆

▶▶▶ A new staff member of Battelle Institute, Columbus, Ohio, is *Joseph F. Thompson*, formerly research chemist with the Dennison Manufacturing Company, Framingham, Massachusetts. Mr. Thompson will be engaged in work as a research engineer in the Graphic Arts Research Division at Battelle. He is a member of TAPPI.

◆

▶▶▶ Official changes were effected the first of the year by United Wallpaper, Inc. *Robert B. Griffin*, vice president and director, has been elevated to the position of senior vice president. *Robert L. Boyd* has been made vice president in charge of operations. Mr. Boyd formerly was general manager of operations.

◆

▶▶▶ On July 1, *John Goldstein*, treasurer and director of Stein, Hall & Company, Inc., New York, will retire from active business. He will terminate 37 years of association with the company.

◆

▶▶▶ Personnel changes announced by Patetson Parchment Paper Company, Bristol, Pennsylvania, are: President—*Wm. C. Leonard;* vice president and general manager—*Richard T. Anderson;* assistant general manager—*J. R. Dufford*, formerly chief chemist; assistant treasurer and director—*H. J. Kendall*, formerly general auditor. *W. J. Gray*, the company's general manager in San Francisco, has been elected a director of the parent company in Bristol.

(continued on page 78)

THE PAST FORETELLS THE FUTURE

Your copy of this fine book is now ready. You will want it as a guide for the future.

The best guide for your future relations with a man is his reputation in the past.

So it is with business institutions.

Today, more than ever before, every individual business must depend on other individual businesses. And that dependence can, and should, be placed only upon those business institutions whose record of performance as to policy, product, service and general attitude has been flawless in the past.

Many new businesses exist today. Many others, old in years, have not kept young in thinking . . . and are passing from the national picture. This has been the history of business since the world began.

Yet, through all the economic changes, certain institutions have grown old in years, but have kept young in spirit and have constantly improved upon their original reason for existence.

The book illustrated above deals with the history of The Falk Corporation, its ideals, accomplishments, and plans for the future so far as those plans can now be projected.

You, too, in your effort to render a service to your industry, must of necessity have followed many of the principles set forth in this book. For that reason we believe that the book will interest you and will provide you with reasons why The Falk Corporation will be a sound source of supply for the machinery you will need to shave pennies from production costs and improve your product, in order to compete in the salesmen's war to come.

THE FALK CORPORATION, *Milwaukee 8 Wisconsin*

IT ALWAYS PAYS TO CONSULT **FALK** . . . A GOOD NAME IN INDUSTRY

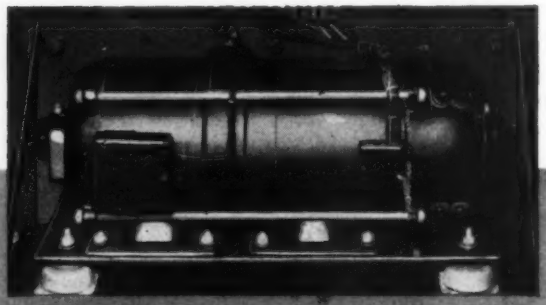
For over fifty years Precision Manufacturers of

District offices, representatives, or distributors in principal cities.

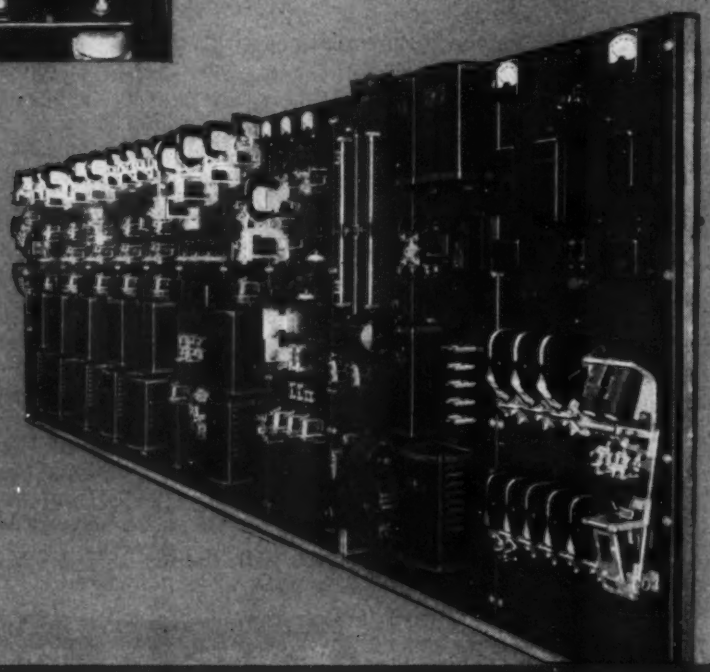
Speed Reducers • Motoreducers • Flexible Couplings • Herringbone and Single Helical Gears • Heavy Gear Drives
Marine and Diesel Engine Gear Drives and Clutches • Steel Castings • Contract Welding and Machine Work

HOLDS DRAW without DRIFT . . .

Now, new simplicity of control has been added to basic advantages of sectional drives for paper machines. Speed regulation is more precise over a wider speed range. Response of the regulator is so rapid that load changes do not adversely affect speed. High-maintenance elements, such as cone pulleys and carbon piles, are unnecessary. This G-E system sets the pattern for flexible operation of tomorrow's high-output machines.



THE G-E AMPLIDYNE—the well-proved amplifying generator that is revolutionizing today's systems for speed and torque control. Only G.E. has the combination of experience for applying it in systems with electronic control to solve practical paper-mill problems.



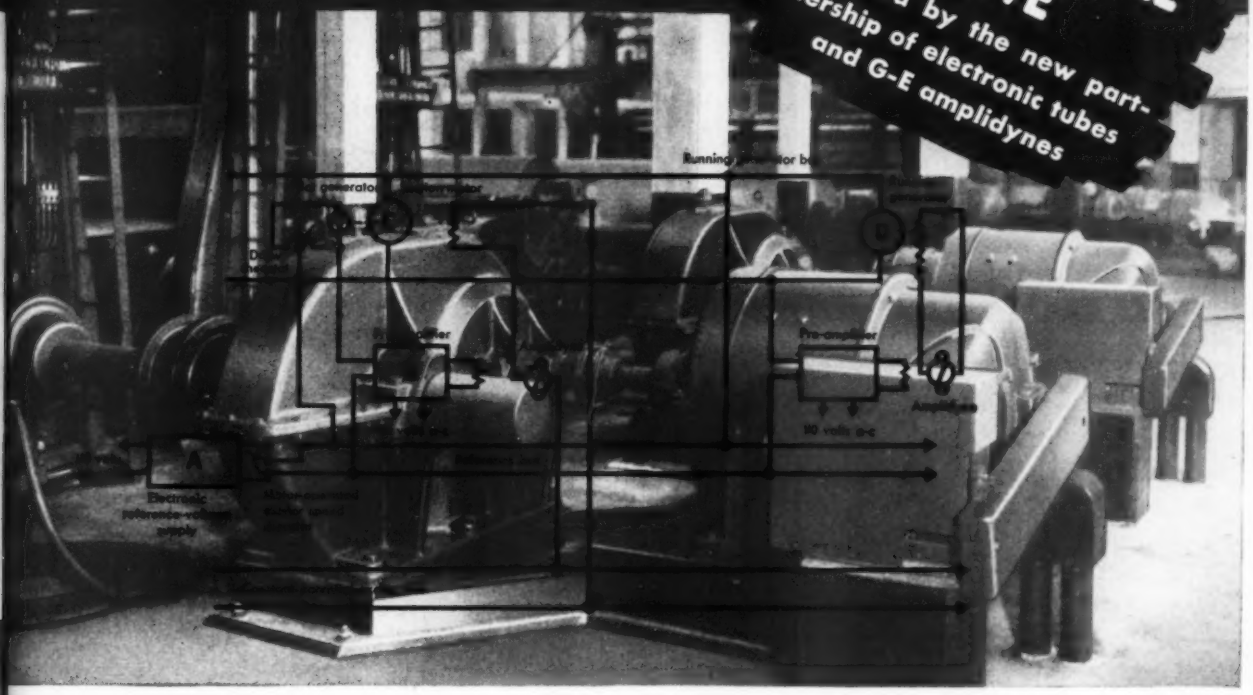
FACTORY-ASSEMBLED PANELS—To save your installation time, G.E. assembles paper-machine control panels complete on a self-supporting steel framework. Shipped complete, they require only motor and line-power connections on the job. This panel was shipped complete for sectional-drive control of a modern paper machine.

GENERAL ELECTRIC

. . . at high speeds or low

G-E SECTIONAL DRIVE

regulated by the new partnership of electronic tubes and G-E amplidynes



HERE'S HOW G.E.'S NEW REGULATING SYSTEM HOLDS SPEEDS TO 0.05 PER CENT

An electronic reference-voltage source (A) is the bench mark for the entire system. Each section motor (C) has a pilot generator, whose output is balanced against this reference voltage source. Any voltage differential is introduced into the pre-amplifier (B), and then, through the amplidyne, acts to change the excitation of the section-motor field. So responsive is the action that the over-all effect in maintaining motor speed seems preventive rather than corrective. Speeds are held within 0.05 per cent of preset levels despite variations in loading.

A small rheostat in each pilot-generator circuit permits close adjustment of draw. A motor-operated rheostat in the voltage-reference circuit provides for preset *over-all* speed control, without disturbing relative speeds or draws between sections.

Voltage of the main generator (D) is also amplidyne-regulated from the reference-voltage source. This makes for greater stability to meet changes in load without affecting the section motors.

G.E. has pioneered in paper-mill sectional drives, auxiliary, and other drives requiring close control of speed and torque. Our practical experience can help save engineering time for user and machine builder. Better check with our application engineers *early* in your plans. *General Electric Company, Schenectady 5, New York.*

Buy all the BONDS you can—*and keep all you buy*

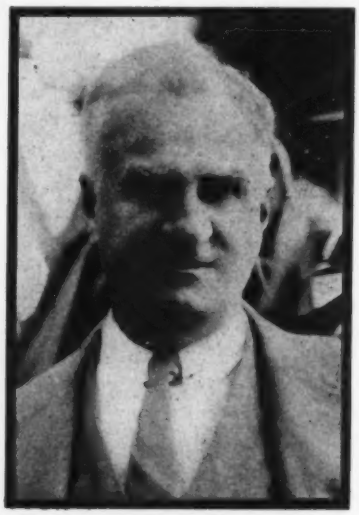
▶▶▶ The Controllers Institute of America announces the election to membership of: *Edward M. Pendergast,* comptroller of The Bagley & Sewall Company, Watertown, New York; *Clarence L. Darby,* secretary of the Birmingham Paper Company, Inc., Birmingham, Alabama; *John V. Bannon,* chief accountant of the Automatic Paper Machinery Company, Inc., Hoboken, New Jersey; and *Gus T. Wegner,* comptroller of the Florida Pulp & Paper Company, Pensacola, Florida. The Institute is a technical and professional organization of controllers devoted to improvement of controllership procedure.

Necrology

JOHN R. MILLER

John Robinson Miller, director, and vice president in charge of sales of the West Virginia Pulp & Paper Company, March 15, at his home in Garden City, Long Island, N. Y., after a long illness.

Mr. Miller served with the company for 49 years. When young Miller was 14, his father was superintendent of Jessup & Moore Paper Company at Rockland, near Wilmington, Delaware, and when the West Virginia Paper Company opened its mill at Piedmont, West Virginia, the father went there as superintendent. The boy went to the Davis High School, Piedmont, and worked in the mill at vacation time. A year later he was transferred to the company's offices in New York, where he worked as office boy. At 29, he opened and managed the Company's office at Chicago, and in 1918 was brought East to become assistant to the president, a post he held until 1921, when he was made director and vice president in charge of sales.



John R. Miller

Mr. Miller was also a director of the company's subsidiaries, American Papers Exports, Inc., and Robeson Process Company.

◆

GEORGE SAXE MACDONALD

Well known as a publisher of trade journals, George Saxe Macdonald passed away at his home in New Rochelle, New York, March 18, at the age of 78.

Mr. Macdonald was president of the Lockwood Trade Journal Company, Inc., which publishes *Paper Trade Journal, Lockwood's Directory of the Paper and Allied Trades,* and *Tobacco.*

He entered the publishing business in 1905 as secretary-treasurer of the Motor Boat Publishing Company. He also was connected with the Radio Dealer Publishing Company and the Gibson Burnham Publishing Company. He had been president and director of the Tobacco Trade Journal Company and the Macdonald Publishing Company since 1921, and of the Lockwood Trade Journal Company since 1923.

He is survived by a daughter and a son.

◆

GEORGE T. HORTON

President of the Chicago Bridge and Iron Company, Chicago, George T. Horton, passed away suddenly March 19.

Mr. Horton had been with the company since he graduated from the Rensselaer Polytechnic Institute. He had been president of the company since 1912, when he succeeded his father, Horace E. Horton.

He was a honorary member of the Western Society of Engineers and a member of the Chicago Engineers Club.

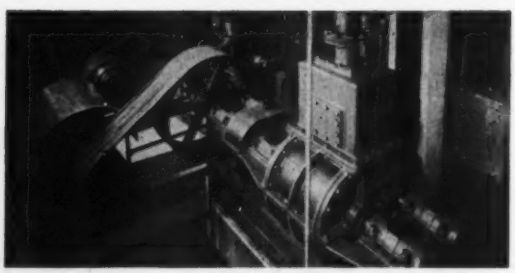
Surviving are his widow and a daughter.

◆

▶▶▶ Friends and acquaintances have sent sympathy to A. S. Harris, president of Harris-Seybold-Potter Company, Cleveland, who has been notified by the war Department that his older son *S/Sgt. Alfred Stull Harris, Jr.,* was killed in Luzon. Sgt. Harris was 27 years of age. He was employed at the Harris plant in Cleveland, at the time he enlisted in March, 1941.

Performance Low Operating Cost

Installation shown below is an "R-C" Vacuum Pump operating a 26" diameter suction roll with area of 8" x 138" on a paper waxing machine.



Double check above features in "R-C" Rotary Positive Vacuum Pumps and you will see why they help to lower production costs per ton of paper.

Roots Connersville Since 1854

Write for Bulletin 50-B-12

ROOTS-CONNERSVILLE BLOWER CORP.

One of the Dresser Industries

504 Monroe Ave. Connersville, Ind.

Improved Moderate Speed VACUUM PUMPS

HANDLING+Processing+HANDLING+Assembling+HANDLING+Packing+HANDLING+Storage+HANDLING

HANDLING—the Common Denominator of PRODUCTION

LET MEN DIRECT POWER—NOT GENERATE IT!

New skills . . . developed by today's modern handling methods, contribute to faster, smoother manufacturing as well as storage and shipping operations. Such opportunities can be found in all phases of production and distribution.

Versatile Towmotor provides an important tool for these new skills—saves time, money and manpower. Get complete facts—write for the Towmotor DATA FILE today.

TOWMOTOR

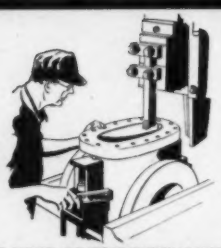
THE ONE-MAN-GANG

TOWMOTOR CORPORATION • 1220 E. 152ND STREET, CLEVELAND 10, OHIO

LUNKENHEIMER PRECISION

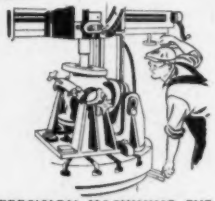
ASSURES PERFECT-FITTING INTERCHANGEABLE PARTS . . . LONGER VALVE LIFE . . . EASIER, LOWER-COST MAINTENANCE

I. B. B. M.
GATE VALVE
Fig. 1430



HE GIVES LUNKENHEIMER VALVES SOMETHING OTHER VALVES HAVEN'T GOT

He machines body guides down to precision tolerances, assuring a perfect guide for the disc and creating a positive center line on which all subsequent machining operations are based.



PRECISION MACHINING THE BODY FOR SEAT RINGS

is precision work to the "nth" degree, for this operation makes inserting the seat rings in a Lunkenheimer gate valve simply a matter of screwing them into position. Parts can be replaced without any machine work or special fitting.

ESTABLISHED 1862

THE LUNKENHEIMER CO.

"QUALITY"

CINCINNATI 14, OHIO, U.S.A.

NEW YORK 13 CHICAGO 6
BOSTON 10 PHILADELPHIA 7

EXPORT DEPT. 318-322 HUDSON ST., NEW YORK 13, N. Y.

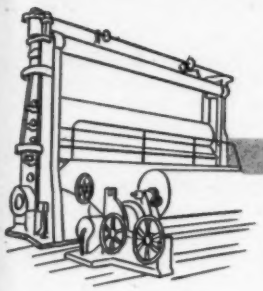
Bronze, Iron, Steel and Corrosion Resistant Alloy Valves, 125 to 2500 Lb. S.P.; Boiler Mountings, Lubricating Devices, Aircraft Fittings

• The smooth-working efficiency and low maintenance cost of Lunkenheimer Valves were not "made in a day". Behind this superior performance and economy lies long experience, and an ideal of precision which guides every operation from design to final assembly.

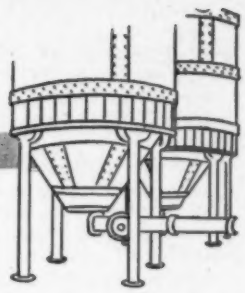
Lunkenheimer Valves have a streamlined simplicity of design . . . a minimum of working parts, each part of extra strength, correctly proportioned and perfectly balanced. This assures longer life with the least trouble and maintenance expense.

A Lunkenheimer Distributor is located near you, equipped and ready at all times to help you solve problems of maintenance or operation.

LUNKENHEIMER VALVES



Practical SHORTS



Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

New Umbrella Type Assembly Bench

A new umbrella-type bench, supported by centrally located legs instead of the usual two outside legs placed at regular intervals along the conventional type bench, has been developed in the Voltage Regulator Division at General Electric's Schenectady works. The use of the new benches has resulted in a 30 per cent improvement in the utilization of working space at assembly and testing benches inasmuch as operators now may be placed anywhere along the benches with no interference from those in-the-way legs.

The benches are 2ft. 8in. high, 22 inches wide, and are constructed entirely of metal with Masonite coverings over the sheet steel tops. The legs, cut from 3-inch standard channel steel, are each welded to a 4x16-in. base and supported by a 4x10-in. upright angle cut from ⅜-inch steel plates. Two holes are drilled in each base to accommodate floor bolts. The legs are welded to the table top and supported by means of two ¼x1¼x8-in. iron straps.

The elimination of half the legs and stringers required for the old type benches, and the reduction in the width of the top, has reduced the cost considerably because only about half the metal is used. The labor cost, too, has been reduced since there is less welding, cutting, and bending to be done, and it is of a simpler nature. It is also much easier to keep the area around the benches clean with only half as many legs to contend with.

The 22-in table top width may seem quite small but there is sufficient space for the necessary tools and equipment without crowding the working area. There is, however, no excess space for the accumulation of unnecessary boxes, lockers, defective parts, and other articles which decrease working efficiency, waste valuable space, and add to a general untidy appearance.—General Electric Co.

Fourdrinier Wire Wash Roll

The first wire carrying roll over which the wire travels after leaving the couch, commonly designated as the wash roll, requires a doctor to prevent stock from gathering upon it. This doctor must fit; and the roll must turn. If the doctor does not fit, it is just possible that one of the roll bearings is worn badly. The only cure for such a condition is a new bearing and proper positioning of the roll.

Sometimes it is necessary to run with a poor fitting doctor. There also may be occasions when it is necessary to trim a strip from the side of the sheet in the wire area where the doctor does not contact the roll. Unless something is done to prevent it, such a strip will wind around the wash roll, building itself up in thickness to a point where it may develop a slack edge in the wire.

As a temporary expedient in a situation of this kind, since the sheet must not be permitted to wind up on the roll, it is possible to keep the roll clean with a small piece of second felt and a short piece of window cord. Usually, the cord should be about four inches long; the felt, about eight inches long and four inches wide. The piece of felt should be folded in the middle crosswise of its length over the cord, the cord being in the hinge of the fold. Then the double thickness of felt is shoved in between the doctor and roll where the stock is gathering. The insertion, of course, is made from the end and with the fold and cord to the front side of the blade. The cord simply prevents the felt from being drawn through between the blade and the roll. This device, while only a poor makeshift at best, will keep the roll clean and will prevent the wire from developing a slack edge.—Archie McCaffery.

◆

Some Power Pointers

Lubricate all machinery to save coal and save machinery as well. In some older factories, as much as 40 to 50% of the fuel for power is wasted in friction.

Stop all steam leaks. At 100-psi pressure a 3/32 in. hole wastes 15 tons of coal a year.

Out in the plant perhaps that cooker, dryer or digester needs overhauling. It may be using too much steam. Check steam traps regularly; they may be leaking and some usually are. Some may be plugged, letting wet steam into your engines.

Check all steam and hot-water piping systems, heaters, pumps, soot blowers, blowdown valves, pump packing glands and

safety valves. You may be wasting several tons of coal each month into thin air.

Are your steam pipes properly covered? Is covering tight? Repair loose or damaged covering.

Does your turbine condenser show the proper vacuum? Is condenser tight and are tubes clean? Are exhauster pump or jets in working order? If not, they may waste a lot of coal.

Tests of steam turbines show a decrease in steam consumption of about 5% for each inch of vacuum between 25 and 27 in., 6% between 27 and 28 in., and 8 to 12% between 28 and 29 in. Suppose you have an 800-hp. turbine using about 10,000 lb. of steam per hr. at 28-in. vacuum. If the vacuum drops to 25 in., this machine uses about 1600 lb. more steam per hour, which requires 160 lb. more coal at a 10-lb. evaporation rate. Cleaning condenser tubes is a tough job sometimes, but you cannot afford not to keep them clean.

Many plants operating reciprocating engines have not indicated the engines for proper valve setting for years. Many of these engines are using from 25 to 50% more steam than they should. The writer has personally checked several such cases. They should be indicated and the valves properly adjusted and repaired, or replaced when necessary.

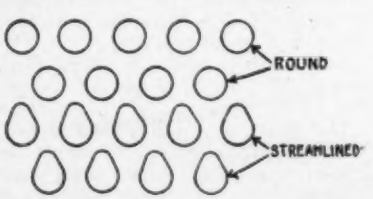
Study your plant load. Peak loads require a lot more coal. Study steam consumption and operating schedules of all machinery in engine room and factory. Enlist the aid of the factory manager and foremen in working out an operating schedule that gives the most uniform steam-flow chart possible. This will save coal, cast iron and steel, and brickwork, as well as a great deal of maintenance labor. Meanwhile steam costs will go down.—R. F. STILWELL.

◆

Streamlining the Tube Bank of the Future

If we could all be a Rip Van Winkle for a hundred years, many surprises doubtless would be in store for us upon awakening. What will steam boilers look like? Engines? Turbines? In fact, will our descendants a hundred years hence use boilers, engines, or turbines at all?

These questions came to mind in reviewing some interesting tests on heat absorption by tubes of various shapes. It was found that two rows of streamlined tubes at the bottom, as indicated in the sketch, will absorb more heat than will round tubes.



The object of the tests was to minimize the friction through the tube bank, and at the same time extract minimum heat from the gases, the tubes being staggered in the usual way.

It is questionable whether streamlined tubes ever will be used in actual practice because of the difficulty encountered in fastening them to the tube sheets. It is a comparatively simple matter to expand round tubes into the sheet, but it isn't so simple to expand streamlined tubes. Besides, under extremely high pressures the tendency of the streamlined tube would be to become circular, which action, of course, would disturb the joint between the tube and the sheet and very likely would result in leakage. On the other hand, welding might be a solution. As everyone knows, great strides in the science of welding have been made in recent years.

Anyway, it is an interesting subject to think about.—W. F. SCHAPHORST.

◆

Metal Cutting with Hand Operated Hack Saw Blades

As important as the proper handling of the blade and frame is the selection of the right blade for the job.

The blade teeth must be fine enough so that at least three consecutive teeth are in contact with the stock being cut at all times. Be especially careful of this when cutting tubing or other thin-walled shapes. Sheared teeth and broken blades may nearly always be traced to failure to observe the "three-tooth" rule.

On general work, where it is not possible to change blades to fit each individual job, the 18-tooth per inch blade is your best standby.

Always be sure to place blade in frame with teeth pointing away from you. Otherwise the blade will not cut satisfactorily.

Speed, or rather lack of speed, is highly important. Never exceed 60 strokes per minute—one per second. Guard against higher speeds especially when you are tired, for the tendency then is to be over-hasty. Many experienced operators run hand frames at only 40 to 50 strokes per minute. In general, use lighter pressures on softer metals, especially when cutting thin sections. Stripped teeth, broken blades and crooked cuts are symptoms of too much pressure.

Stroke should be long and steady; use all the teeth on the blade. "Put your best foot forward," applying all the pressure on the forward stroke. No blade does any cutting on the return stroke, and it pays to lift the blade slightly on this recovery. Run the blade on a slight slant forward and downward, as this is most natural and hence least tiring, and just as effective as a horizontal stroke.—CLEMSON BROS, INC.

◆

Keep Belts Tight

Belts should always have enough tension to carry the peak load without undue slip but at the same time should not be so tight as to stretch the belt excessively or to overload the bearings. Long horizontal drives may have a very marked sag in the slack strand and still have adequate tension. Short center drives should have both strands taut. The greater weight and elasticity of the long belt makes it an easier drive. When the belt is of high quality and of sufficient weight and width to properly carry the load, there should be little trouble from either stretch or slip. If the belt should stretch, and even good leather belts may stretch enough to lower the tension when new, it should be shortened, or the tension adjusted if the rotor is on a sliderail base, to avoid loss of power and the falling off of output through slipping of the belt.

A properly installed leather belted pivoted motor drive may often be installed to accurately control belt tension reducing slip and creep loss to less than ½ of 1%. This means nearly uniform driven speeds can be maintained throughout the life of the drive.

With flanged or step-cone pulleys, we have an additional danger, for if the belt becomes loose, it is apt to run up on the flange or stop pulley and may be either seriously stretched and curled on one or both edges. Belts should be kept snug on these drives.—SAMUEL L. ALLEN.

◆

Handling Paper Rolls (Groundmen and Pitmen)

1. Groundmen and pitmen should tear away all loose paper from the ends of rolls. When necessary to walk on top of a stack of rolls, use great care to avoid slipping or stepping on a loose fold of paper.

2. Make sure that plugs are knocked completely flush into the ends of rolls; otherwise there is danger of the roll slipping out of the grapple hooks.

3. If tong type hooks are used, be sure that the ends of the hooks are securely in the ends of the roll.

4. Be sure that the end roll is securely chocked before giving any signal to lift a roll.

5. Do not attempt to pull a roll that will not come up freely—it may be wedged between others. Remove the top roll first.

6. Before giving the signal to lift a roll, make sure that you and other men are far enough in the clear to avoid the roll if it should swing.

7. Keep out from under all loads and from under the crane when it is in motion.

8. All rolls should be rolled in the direction they were rewound. This calls for the cutting or trimming of rolls on a cut

stick. Keep your feet in the clear.—*Safety Instruction Card No. 499,* NATIONAL SAFETY COUNCIL.

◆

How to Align Shafting and Pulleys

Belting cannot give good service if the pulleys or shafting are out of alignment. Indications of misalignment are: belt running off the pulley at one side or rubbing or climbing on flanged or step-cone pulleys.

A simple test to determine whether the fault is the alignment or a crooked belt, is to turn the belt inside out or end for end. If it still runs to the same side of the pulley as before, the fault is in the alignment—not the belt.

It is important to check drive alignment at least once a year. In multiple story buildings, shifting of loads on floor above shafting may cause it to be distorted or thrown out of alignment.

Some common faults in drive alignment are:

1) Shafting carrying driving and driven pulleys may not be parallel.

2) Shafting may be sprung out of line. (Hangers should always be located near the pulleys, the points of maximum load.)

3) Driving and driven pulleys may be offset.

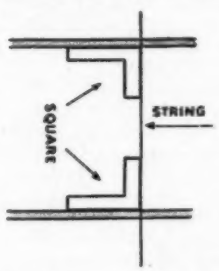
4) Pulley may be eccentric with shafting.

An easy method of aligning pulleys and shafting is shown in the following diagram.

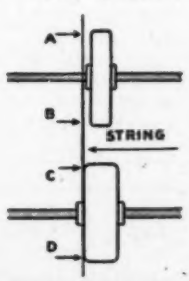
Procedure:

1) Check shafts with level.

2) Determine if shafts are parallel by placing taut string between shafts and check with large square (See illustration).



3) Check alignment of pulleys using string along their edges. If pulleys are same width, string should touch lightly at four points: A, B, C, and D. If pulleys



are of different widths, distance from string to pulley at points A and B should be the same. If possible, give pulley half turn and recheck.

Recrown fibre pulleys when they wear. When belts run off the center of motor pulleys, it may be due to a worn crown.—AMERICAN LEATHER BELTING ASSOCIATION.

◆

Factors Bearing Upon Selection of Proper Gasket

The efficiency of any gasketed joint depends upon the correct selection of gasket design and material to meet all the operating conditions to be expected in the particular closure under consideration.

The following factors all have a bearing upon the selection of a proper gasket and a failure of the joint to function properly may occur if any one of these points is neglected:

1. Substance to be sealed; i.e., steam, water, oil, chemical solutions, etc. If a chemical or other corrosive substance, its concentration should be known.

2. Pressure to be sealed—both operating and test

3. Operating temperature range and cycle time

4. Type of flanges; i.e., welding neck, van stone, etc.

5. Nominal flange size and material; i.e., carbon steel, copper, nickel, etc.

6. Actual flange dimensions: inside and outside diameters and thickness

7. Kind of flange facing; i.e., raised face, tongue and groove, ring type, etc.

8. Contact surface dimensions

9. Contact surface finish; i.e., smooth, serrated, phonograph, etc.

10. Condition of contact surfaces; i.e., new, good, pitted, etc.

11. Number and size of bolts and their bolt circle diameter

12. Bolt material; i.e., carbon steel, SAE 4140, etc.

13. Limitations on gasket thickness

14. Number of times joint must be opened.—GOETZE GASKET & PACKING CO., INC.

◆

Use Meters and Gauges

A plant large enough to justify a steam-flow meter and a means for weighing coal should have them because they often point the way to a saving in steam consumption outside the boiler room, while providing the means for a daily record of various operations.

Another thing every plant should have is draft gauges. They aren't expensive. After proper adjustment by an Orsat, they tell the fireman a lot about his fire, slag on tubes, holes in baffles, loose or broken dampers, fan condition, speed, etc.

Coke in the ashpit (when traveling grates or underfeed stokers are used) or in the flyash (when spreader stokers or pulverizers are used) is another serious coal waste which many plants could reduce. First principle is to clean fires when they need it—not by the clock. Obviously, higher ash coals need more frequent cleaning. Fires should be burned down, but periods between cleaning should not be too long, or excess-air loss will be much greater than that due to coke in the ashpit.

In terms of total heat in coal, 30% combustible in the ashpit refuse is relatively small. Good operation usually keeps the combustible below this figure with almost any equipment burning suitable coal at a fairly high rate.—R. F. STILWELL.

◆

Cleaning Beater Back-Falls

1. Do not attempt to clean the back-fall of a beater unless you are familiar with the work and have done it before.

2. Have a fellow-worker always present with you while the work is being done. Under no circumstances attempt to clean the back-fall alone.

3. Shut down the power and wait until the machine stops.

4. Use great care in climbing to the top of the beater.

5. Make sure that the paddle used for prying out wedged stock is made of 2 x 4 inch straight-grained hardwood, with two-thirds of its length turned down to form a handle tapering to not less than 1½ inches at the end.

6. Brace yourself securely while prying, so that if the stock should give way suddenly, you will not fall.—*Safety Instruction Card No. 507,* NATIONAL SAFETY COUNCIL.

Heat Loss Due to Combustible in Ash and Refuse, Per Cent

ASH IN COAL	ILLINOIS COAL (68% carbon)					W. VIRGINIA COAL (79% carbon)				
	Combustible in refuse					Combustible in refuse				
Per cent	10%	20%	30%	40%	50%	10%	20%	30%	40%	50%
.05	0.7	1.5	2.6	4.0	6.0	0.6	1.3	2.3	3.5	5.3
.06	0.8	1.8	3.0	4.8	7.2	0.7	1.6	2.7	4.0	6.3
.07	0.9	2.1	3.6	5.6	8.4	0.8	1.8	3.2	4.9	7.4
.08	1.1	2.4	4.1	6.4	9.6	0.9	2.1	3.6	5.6	8.4
.09	1.2	2.7	4.7	7.2	10.8	1.0	2.4	4.0	6.3	9.1
.10	1.3	3.0	5.1	8.0	12.0	1.2	2.6	4.5	7.0	.0.5

The Golden Rule a Yardstick for all Human Relations *

▶▶▶ BEFORE SPEAKING TO YOU on public relations, I want to thank this Association, first, for making it possible for me to occupy the position I now hold, because I understand that this Association played a large part in persuading the American Paper and Pulp Association to retain a public relations consultant, and second, for the opportunity you have given me to meet with you today.

In speaking to you, I feel like an amateur talking to a group of experts, because your entire training has been that of selling perhaps the most hardboiled section of the public, namely, purchasing agents; and I believe everyone of you consciously or unconsciously knows more about real public relations than I do.

The term public relations is perhaps the most widely used and least understood of any definition in the English language. Most people think of it merely as publicity. Real public relations goes infinitely further than that.

The objective of any real industrial public relations campaign is to create a public opinion favorable to the industry and to the products which it manufactures. Any industry's first contact with the public is its contact with its own employees, who, in some cases, represent a considerable percentage of the American people. Consequently, the first objective of an industry's public relations campaign should be to sell its own employees.

This brings up, immediately, the more or less complicated problem of industrial relations. But, in its final analysis, this problem is not nearly so complicated as it is sometimes made to appear, because it simmers down to a basic psychological principle.

A human being has no contact with things outside of himself except through his five senses. He is a little world all by himself. His only real interest is in what affects him—his home, his family, his ambitions, his possessions. He likes anyone who takes a real interest in him.

Test this in your own life. Instinctively, you like anyone who really likes you. That is why you are so fond of your dog. You are pleased to welcome anyone who will listen to you talk about yourself. You avoid another who always talks about himself.

You know from your own experience that all successful advertising and selling campaigns play up the "you" approach.

COLONEL F. R. SCHELL
American Paper and Pulp Ass'n

For this reason, practically every industrial relations problem can be solved by a man of ordinary intelligence, if he will apply the only real basic principle of leadership. This principle was given to the world about nineteen hundred years ago by the greatest leader of men the world has ever seen, Jesus of Nazareth, "Therefore all things whatsoever ye would that men should do unto you, do ye even so to them."

Because he learned this Golden Rule at his mother's knee, the average man considers it visionary and impractical. On the contrary, it is the most practical formula for human relations ever given to mankind. As a morals and loyalty builder it has no equal. It encompasses more than is known by all the world's advertising, public relations, industrial relations, sales, efficiency, production, and management experts combined, and the application of it is perfectly simple. All that a business executive who is considering some course of action in regard to his employees has to do is to ask himself, "Would I like this to happen to me?" If the answer is no, it is wrong; if it is yes, it is right. It is one rule that always works.

Many large corporations and groups of corporations annually spend millions in institutional advertising and publicity campaigns to sell the general public, when they have a large percentage of that same general public on their own pay rolls and antagonize them six days a week.

It is surprising how much intelligence many industrial leaders have displayed in the development and routine conduct of their business, but how little of the same intelligence they have shown in dealing with human beings.

In my opinion, if the Golden Rule were applied to all relations between management and workers, labor legislation and labor boards would be unnecessary; industrial relations directors would lose their jobs; unions would cease to exist; industrial peace would reign and profits would soar to undreamed-of heights.

If our system of private enterprise is to endure, the heads of our great corporations and the proprietors of our smaller businesses will have to wake up and display as much intelligence in the conduct of their human relations as they do in the other aspects of their business.

The preservation of liberty throughout the world may yet depend on the application of the Golden Rule to American industrial relations and the ironical aspect of the whole situation is that the owners of business and industry would make more money by the practical application of this basic principle of leadership than they have ever made under the prevailing system of the exploitation of labor.

Consequently, as I look at this problem, the first job before us is to sell our own employees. Until we have done so, it is a waste of paper and ink to carry on a publicity campaign, for, in the words of Emerson, "What you are talks so loud I can't hear what you say."

I believe that the second step in our public relations plan should be to sell the communities in which our industry operates. If the employees are sold, particularly in the small mill towns, this job will have been half done.

There are many ways by which this can be accomplished. It can be done by mill executives taking an active part in local civic affairs, cultivating the friendship of local leaders, joining local fraternal organizations, and particularly by bringing the local school children to the mill and, under competent guidance, showing them how paper is made and explaining to them what an important place it occupies in the war and in the civilian economy.

Having sold our employees and our mill communities, the next step should be to sell the mill states. I think that the best approach to this would be through the graduating classes of the state high schools. Courses of instruction for these classes on pulp and paper, should be provided by the industry and, at their completion, the students should be brought to

(*) An address given by Colonel Schell before the Salesmen's Association of the Paper Industry in New York City on March 19, 1945. Colonel Schell is in charge of the APPA Public Relations program which was instituted in January, 1945.

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TODAY more than ever, paper makers are insisting on General Chemical "Alum" in their operations because they can rely on its uniformity for maximum sizing and desired pH.

Careful attention to all production details plus constant laboratory control make General Chemical Aluminum Sulfate a product of high quality in its various grades. Specify "General" for your quality paper-making chemicals!

[redacted]

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[redacted]

Solutions: from 38°—60° Baume. Wt. Ratio (Na_2O to SiO_2) from 1:2.00—1:3.40.

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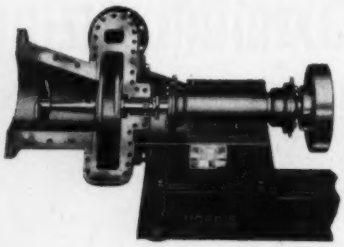

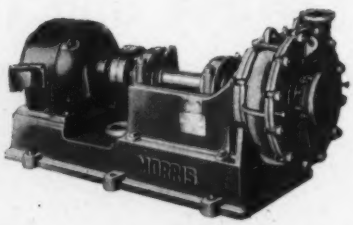

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TYPE ST-P STOCK PUMP

Satisfying the prime requisite of a stock pump, the Morris Type ST-P provides constant uniform flow—even with high consistency stock. There is little tendency for the Morris impeller to extract the water from the stock and leave dehydrated paper fibre to clog the intake pipe. That's because the patented suction booster mechanically agitates and propels the fibre into the suction eye of the impeller. Under whatever condition of loading, the size and mounting of the shaft makes deflection negligible and keeps packing wear at a minimum.

Where foaming stocks are encountered, or stocks that contain large amounts of entrained air, the horizontal top discharge—plus the action of the suction booster—speeds the escape of air from the pump and prevents air blocks from forming in the eye of the impeller.

Write for Bulletin 176.

MORRIS
TYPE S LIQUOR PUMP

Providing uniform delivery of high output at desired pressures, with a minimum of wear, corrosion and packing troubles, Morris Liquor Pumps are used for handling black liquors in pulp mills all over the country. They consistently outlast and outperform lighter pumps. Even when handling highly viscous liquors at high temperatures, they maintain their efficiency over longer periods.

Morris Liquor Pumps have more metal where metal counts most. Designed for moderate speeds, they keep vibration and abrasive wear at a low point. The pumps are capable of operating against high heads caused by high pipe friction losses and often high terminal pressure. The parts in contact with the liquor are furnished either in nickel iron, Ni-resist or stainless steel, depending upon the abrasive or corrosive properties of the liquor.

Write for Bulletin 173.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Branch Offices in Principal Cities

MORRIS CENTRIFUGAL PUMPS

the various mills in the state and taken on a personally conducted tour of one or more mills to wind up their course of instruction. Upon their return, they should be given an examination on the course for which suitable prizes might be donated by the industry.

The graduating classes of high schools on Long Island take an annual trip to Washington during Easter week. These trips are financed by dances, high school plays, etc., and in some instances, money is provided by boards of education. Trips to the mills by the graduating classes of high schools of mill states could be financed in the same way without any cost to the industry.

This idea might be further expanded in the mill states by having one or more open house days when the residents of mill states would be invited to visit the mills.

The procedure in other than mill states would be the same, except that the mills would have to be omitted.

The next step in a public relations compaign should be an endeavor to amplify what we have already done by educating the general public through all media of publicity and by taking advantage of every opportunity to bring the industry to the attention of the public through news releases, feature stories, motion pictures and the radio.

This association is industry-wide, and has a better realization of public relations problems and procedure than perhaps any other association in the industry. For this reason, it is eminently qualified to supply ideas and material to, and be the driving forces behind the public relations activities of the entire industry.

Therefore, I am going to take the liberty of recommending that your president appoint subcommittees of your Public Relations Committee, to study the various major overall uses of paper products, such as, sanitation, communication and records, education, etc., and prepare publicity material and booklets for distribution to the industry based on these studies. These booklets could be partially self-liquidating like the instrumentation reports.

I would also like to suggest that you consider the possibility of this association participating in our public relations program by taking over the educational part of it.

As you know, there are now in existence a number of films dealing with the industry, and I believe that from these a new series of films, entirely devoid of commercials, could be prepared for wide distribution to schools and colleges, and that, therefore, they could be made at comparatively little expense. To these should be added film slides, educational booklets, teaching instructions, etc., which should be prepared by someone who has had broad experience in teaching, particularly in the field of visual education. I suggest that this association consider taking over this entire project, and I can assure it that I will be very glad to give it whatever assistance I can.

I have talked far too long already, and in closing, again wish to express my appreciation of the opportunity that you have given me to speak to you today.

THE WORLD'S LARGEST PIECE OF HOSE

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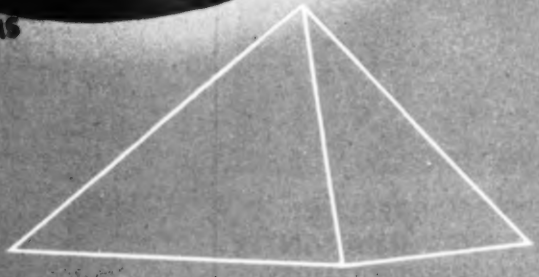
More than 30,000,000 cubic yards of Mississippi River bottom have already passed through this hose.

This amount of material would make 10 pyramids, each as large as the Great Pyramid of Egypt

It would fill a trench two yards wide and two yards deep that would reach from Boston to Los Angeles.

This piece of hose was installed in 1940 as a flexible joint on the suction end of a hydraulic dredge. It is still in use and GOING STRONG!



DIMENSIONS OF GREAT PYRAMID

Base: 750 ft. x 750 ft.
Height: 482 ft.
Contents: 3,041,148 Cu. Yds.

BOSTON WOVEN HOSE & RUBBER COMPANY

BOSTON WOVEN HOSE TRADE MARK AND RUBBER COMPANY

WORKS: CAMBRIDGE, MASS., U.S.A. P.O. BOX 1071, BOSTON 3, MASS., U.S.A.

Convention Papers . . . Abridged

The abridgments in the first part of this section are from papers presented "by title" at the annual meeting of the Technical Association of the Pulp and Paper Industry, held in New York City, February 19, 1945

The Utilization of the Milkweed Plant in the Paper and Paperboard Industry*

LOREN V. FORMAN[1] and DONALD D. NIEMEYER[2]

The necessity of substituting milkweed floss for Java kapok in the war program led the Office of Production Research and Development of the War Production Board to establish a project at The Institute of Paper Chemistry dealing with the components of milkweed. The production of floss from cultivated areas would permit collection of the entire milkweed plant which would serve as a possible source of raw materials that are essential for war purposes. The economic recovery and utilization of other components of the milkweed would reduce the cost of the floss. Among the many phases of this problem which were studied was the possibility of using milkweed stalks for paper and paperboard manufacture.

The milkweed is a dicotyledonous plant in which the vascular tissue forms a continuous ring without distinct bundles. This is the familiar arrangement found in flax, hemp, and jute, as well as in the majority of stems of herbaceous plants.

In the center of the older stem is a large space which was originally filled with pith parenchyma cells. The pith area constitutes about 25 per cent of the total cross sectional area of the stem. A few fragments of the pith cling to the woody ring which surrounds the pith area. This wood or xylem is made up of vessels, fibers, and ray parenchyma tissue. These fibers are approximately 0.5 mm. long and occupy at least 50 per cent of the xylem.

Outside of the xylem is a very narrow layer of cambium and beyond it lies the phloem, consisting of sieve tubes, bast fibers, latex tubes, and storage and conductive parenchyma. In the older stem, a so-called bark material outside of the cambium layer probably occupies 10 or 15 per cent of the stem area.

In the main, there are two types of fibers which might take part in the papermaking process: the bast fiber present in the phloem and the vessels and fibers in the xylem. The cells which make up the bast fiber occur in rows of bundles with each bundle surrounded by parenchyma and associated latex vessels. According to Gerhardt (Gerhardt, F. Commercial possibilities of the common milkweed. *Ind. Eng. Chem.* 22:160-163, 1930) the fiber cells are from 15-25 mm. and from 0.25 to 0.50 mm. in diameter. The cells are soft, pliable, and light colored; they are finer in texture than hemp and resemble flax very closely in appearance. The stalks contain approximately 10 per cent bast fiber and 70 per cent woody fiber.

Two species were studied, namely, (1) *Asclepias incarnata*, swamp or lowland milkweed and (2) *Asclepias syriaca*, upland milkweed.

The whole milkweed stems were chopped into two- to four-inch lengths and were pulped in a gas-fired rotary digester, using the sod and neutral sulphite processes. The yield was determined after washing the cooked material in a muslin-covered wash box. Each of these pulps was defibered in a five-pound Dilts beater equipped with a washing drum. Various periods of washing were applied in order to leave different amounts of short, woody fiber in the pulp.

A three-stage bleaching process was then applied. If the degree of cooking was adequate so that a relatively clean bleached pulp was obtained, beater strength evaluations were made. The beater consistency was 1.52 per cent on the moisture-free basis in each instance. Sheets were formed using Institute Method T 411.

Small quantities of Celite and Hexalin were added to the digester charges of several cooks. The Celite was included to determine whether it would adhere to the latex particles and prevent them from agglomerating to a size such that their presence in the pulp would be objectionable from the standpoint of dirt specks. Hexaline was added with the expectation of dissolving the waxes in order to facilitate access to the cooking chemical to the fibrous material and, hence, to promote uniform pulping.

In order to compare the yield data of the laboratory cooks with the actual cellulose content of the milkweed stems, chemical analyses were made.

In order to produce a bleachable pulp from the whole milkweed stems, drastic cooking conditions were necessary. A reduced temperature and chemical ratio in a soda cook resulted in a pulp which contained woody material that was extremely resistant to bleaching. It was observed in other experiments that the bast fiber could be easily purified by mild cooking and bleaching. The hard woody material, if insufficiently pulped, remained in the bleached pulp in the form of shives.

The neutral sulphite process produced pulps of higher yield, strength characteristics, and viscosity than those obtained by the soda process. A sulphite pulp produced from northern spruce or a bleached kraft pulp from southern pine would be far superior to milkweed stem pulp in yield and strength. On the other hand, the milkweed pulp would probably be stronger than the common hardwood pulps. Because of the lower over-all yield, the lower density of the raw material with consequent lower yield per digester, and the possible high dirt content from soil particles, latex, wax and shives, it is doubtful whether bleached pulp made from whole milkweed stalks could compete on an economical basis with the common bleached pulps, unless some particular property was present which would make it outstanding for use in a specialty paper.

Because the bast fiber of the milkweed stalks contains a large proportion of long fibers, it would seem that, if this fraction were separated before pulping, it would probably make a stronger paper than the whole stalk which includes a large amount of the short, woody fibers.

The method of separation of the bast fiber involved rod milling and screening. A Marcy rod mill (12- by 24-inch) was charged with 500 grams (on the dry basis) of the milkweed stems as received. After 10 minutes of rod milling, the material was transferred to a gyratory screen. The upland variety was screened on an 8-mesh screen. A 12- and a 40-mesh screen were used for the successive fractions passing through the coarser screen. The fiber of the lowland variety separated readily, so that a single screening on a 12-mesh wire gave a good separation. Much of the woody material in the upland variety was reduced to a small particle size, because of its brittle nature. However, the woody material in the lowland variety remained in the form of large resilient fragments.

(Continued on page 92)

*This work was carried out at The Institute of Paper Chemistry under WPB contract No. 76, and is published with its permission.

(1) Research associate, (2) Research assistant, The Institute of Paper Chemistry, Appleton, Wisconsin.

STEAM PRESSURE
DOES NOT GUARANTEE
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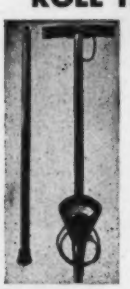

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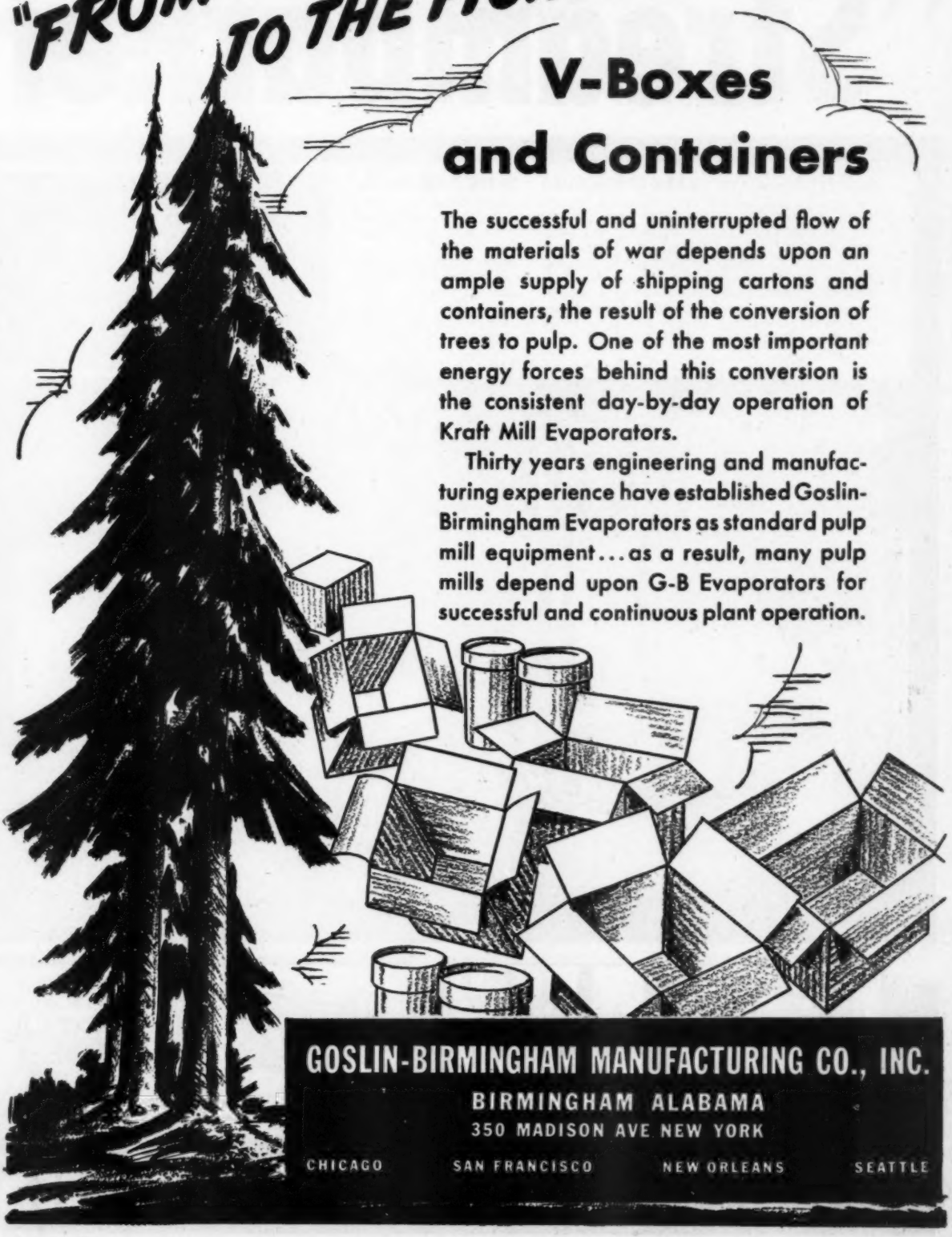

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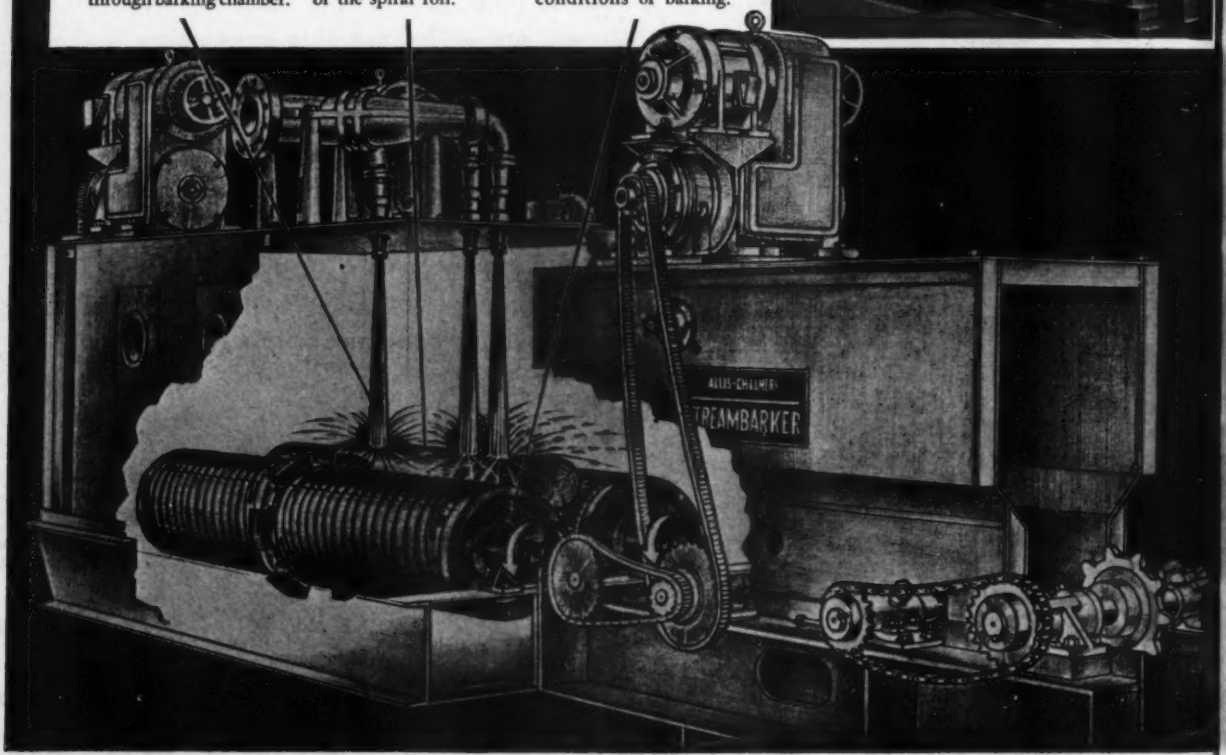

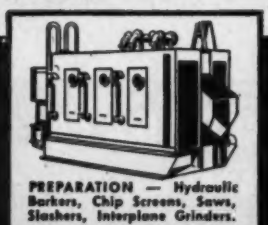

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DEVELOPMENT NEWS

POST-WAR OUTLOOK for Sulphate Mills, both in U. S. and Canada, points to a large program in *modernization* of present lime recovery systems, *expansion* of facilities, and *new mill* construction.

Sulphate pulp tonnage, which has tripled in the past 10 years, increased 14% since the last peace year, is expected to *go on increasing* after the war. Still another factor, the return of *competitive production* with emphasis on lower costs, will weaken the position of many normally marginal mills who overlook the trend.

7 by 120 ft A-C Kiln for Southern Sulphate Mill.

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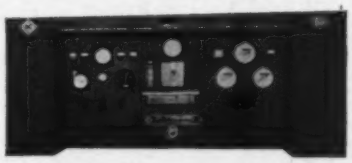

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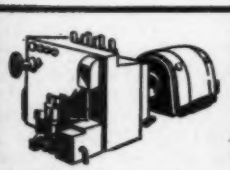

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In another type of operation, sodium hydroxide and water were added to the rod-mill charge, and the temperature was raised to 95 C. with steam. After 10 minutes of treatment with the rods, the pulp was screened on a 40-mash gyratory screen with a stream of water spraying on the pulp. The washing was continued until the effluent water contained very little of the milkweed fines.

According to this method of separation, approximately 15 per cent of the milkweed stalks was bast fiber. Although some of the bast fiber was reduced to a small particle size, so that it appeared with the rejects, this was roughly equivalent to the amount of woody material which remained in the bast fiber fraction.

The alpha-cellulose content of the bast fiber was over 60 per cent, as compared with less than 40 per cent in the original milkweed. The lignin associated with the bast fiber was appreciably lower than in the whole stem, although the extractive content was about the same as in the original stalks.

Several exploratory cooks in milkweed bast fiber were made in small stationary autoclaves, heated by means of an oil bath. The bast fiber of both varieties separated in the dry rod milling and screening, and the decorticated bast fibers were used in these experiments. With the results of these cooks as a guide, conditions were selected for four soda cooks and a neutral sulphite cook, which were performed in rotary digesters on the dry separated bast fiber and on the caustic rod-milled and wet-screened upland milkweed stalks.

The yield of bast fiber pulp (based on the whole stalk) was less than 10 per cent in each instance.

The bast fiber pulps bleached to a relatively high brightness under mild conditions. The bleached pulps had a high alpha-cellulose content and a low viscosity. The dirt content was relatively low in two cooks because of the increased washing efficiency resulting from the addition of Hexalin to the Dilts beater. Although 500 ml. were used, equally good results might have been obtained with the same amount of Hexalin applied to a larger amount of pulp at higher consistency. The concentration of Hexalin in these experiments amounted to approximately 0.5 per cent of the weight of the water charged to the washing beater. The addition of Hexalin and Celite to a digester charge was not as effective from the standpoint of dirt content in the pulps as was washing with Hexalin in the beater.

The bast fiber pulps were characterized by their slimy nature and long fibers. In these respects, the pulp resembled flax pulp. Above a Schopper freeness of 500 cc., the sheet formation was very poor.

The upland variety had slightly better strength characteristics than the lowland type when identical cooking conditions were used for the two varieties. This advantage might be offset by the slightly higher yield and lower latex content observed in the lowland milkweed bast fiber pulp.

The neutral sulphite process applied to the upland bast fiber produced a stronger pulp which beat faster than the comparable soda pulp.

The similarity in fiber structure and beating characteristics between milkweed bast fiber pulp and flax pulp suggests that a use might be developed for this material in the manufacture of cigarette paper. In view of the low yield, it does not seem that a separation of milkweed to produce a pulp from the bast fiber would be feasible unless a desirable product could be made from the rejected woody fractions.

One of the possible uses for milkweed stalks might be as a total or partial substitute for straw or unbleached kraft pulps in the manufacture of paperboard. To demonstrate the feasibility of this application for milkweed, 9-point board handsheet were made and evaluated for physical characteristics.

Pulp was prepared from the upland stalks by cooking with soda ash. Defibering was carried out in the Dilts beater by circulating with the roll in a raised position for a period of 10 minutes. The roll was lowered to zero clearance and the pulp was beaten for 15 minutes to a Schopper freeness of 370 cc. After washing for 10 minutes, the freeness was 640 cc. The pulp was thickened and the yield was determined.

The rod mill was also used for preparing pulp for board handsheets. Both varieties of milkweed stalks were rod milled with 7 per cent sodium hydroxide. The yield of pulp from the upland variety

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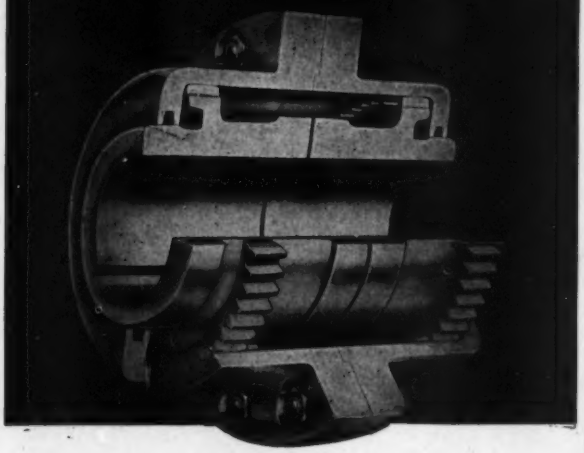

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after this operation was 71.6 per cent. The pulp was not washed, because only a small amount of caustic was present after rod milling.

Beating was performed in a 1.5-pound beater and board handsheets were prepared on a Williams mold, masked to produce an 8-inch square sheet. After pressing and drying, the sheets were calendered lightly.

Handsheets were also prepared from a mixture of the caustic rod-milled milkweed stalks and repulped old newspaper.

The woody fiber of the lowland stalks was too resistant to permit adequate defibering in the rod-milling operation. This was reflected in the lower strength of the board sheets. Apparently, more drastic pulping conditions, such as a lime or soda ash cook, would be required for pulping the lowland variety for this purpose.

Both methods of converting upland milkweed to pulp appeared to be practical. The soda ash cook gave a stronger and stiffer board. It seemed to excel in stiffness, a desirable characteristic for corrugating board.

The addition of old newsprint to the milkweed resulted in little change in the strength characteristics.

If the laboratory results can be duplicated in commercial opertion, it would be feasible to use milkweed stalks as a substitute for straw and certain repulped waste papers. Milkweed might command a higher price than straw because it produced a higher yield of pulp.

If the bast fiber of the milkweed stalks were to be used in the manufacture of high-grade pulp, it would be necessary to utilize the woody fraction for a salable product. The most logical use would be to incorporate the woody material in paperboard. For this application the fine dust particles obtained in the bast fiber separation probably would not serve a useful purpose. However, the fines might be used as a fuel.

The rejects were cooked either with lime, soda ash, or water. After obtaining yield data, all the pulps, except that of one cook, were defibered in the 1.5-pound beater. For the latter cook, the pulp was defibered in the rod mill before the beater treatment.

Handsheets were prepared on the Noble and Wood sheet mold according to the method used for the whole milkweed paperboard. In addition, old newsprint and kraft were mixed with some of the pulp.

The small particle size of the woody material after it was pulped contributed to a low freeness and a low wet strength which made board sheet making difficult. The soda ash cook produced pulp which was somewhat better than that obtained with lime or water cooking. The low bursting and tearing strength of the reject pulps suggests that it would be necessary to add another pulp to the furnish. The selection of old newsprint for this purpose was of no benefit, because the two types of pulp were similar to each other in their physical characteristics. However, the use of kraft cuttings and kraft waste with the milkweed woody fraction might be feasible. It is possible that the milkweed rejects would add stiffness to the kraft board and might result in improved strength because of better formation in a mixture of long fibered kraft and short woody fibers.

Clariflocculation of Mill Waters

F. P. LASSETER and B. J. QUEERN
The Dorr Company

As an introduction to the subject of white water and mill waste water treatment, it is felt that a brief review of fundamentals is in order.

The primary objective of any treatment applied in paper mill waste water is to coagulate or flocculate the fine particles of suspended turbidity and color into small clumps so that a crystal clear water is observed between these clumps. Separation of the latter from the clear suspending medium is a secondary phenomenon and takes place as a consequence of, and according to, the laws of settling applicable under the conditions obtaining after flocculation is complete. Suitable basins must, of course, be provided for the continuous separation of the phases and for removal of the sludge resulting. The rate and excellence of flocculation are controlled by two factors, the probability of collision and the probability of adhesion. The objective of chemical dosing

(Continued on page 98)

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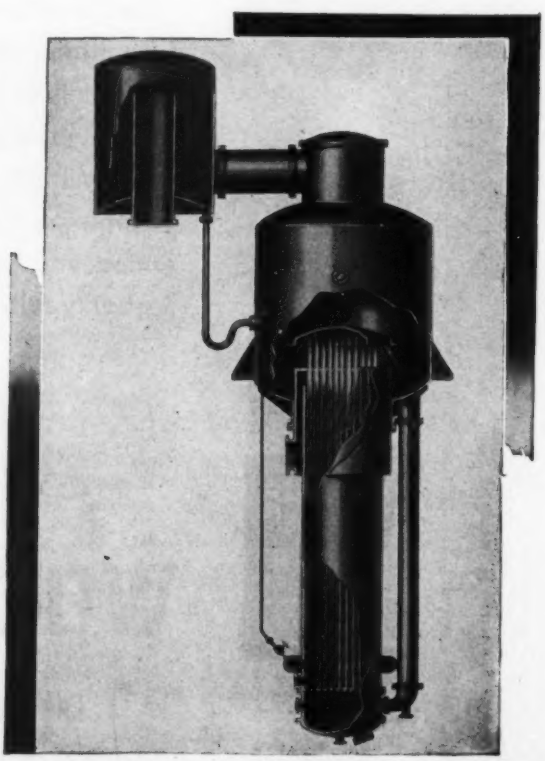

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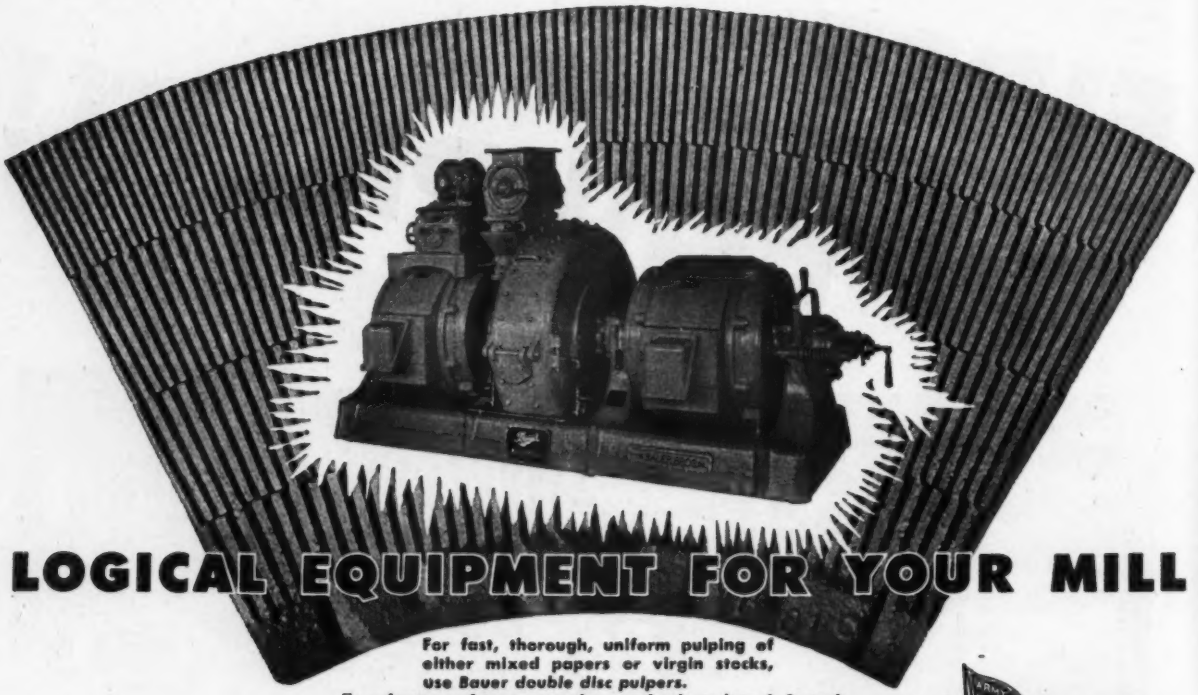

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for any system is to influence the probability of adhesion. The aim here is to add chemicals which serve to adjust the pH to an optimum for coagulation and at the same time provide enveloping films which serve as bonds holding the clumps intact after formation. Coagulation can be promoted by charge neutralization only by adjusting the pH of the system to the iso-electric point of the suspended particles. Most industrial applications of flocculation, however, take advantage of the enveloping film effect by using aluminum or iron salts as coagulating reagents. The more recent developments in flocculation employing activated silica most probably take advantage of the effects of an enveloping film technique. Special starches and glues sometimes employed for coagulation behave in the same way.

Once the waste water system is so dosed chemically that the probability of adhesion is satisfactorily adjusted the probability of collision is the controlling factor influencing the rate of coagulation. In most paper mill white waters the particles are sufficiently close together to promote rapid flocculation after suitable coagulants are added. A change or two in direction of flow will permit enough shear to result in complete flocculation in a relatively short time. Flotation type savealls are dependent on this for satis-

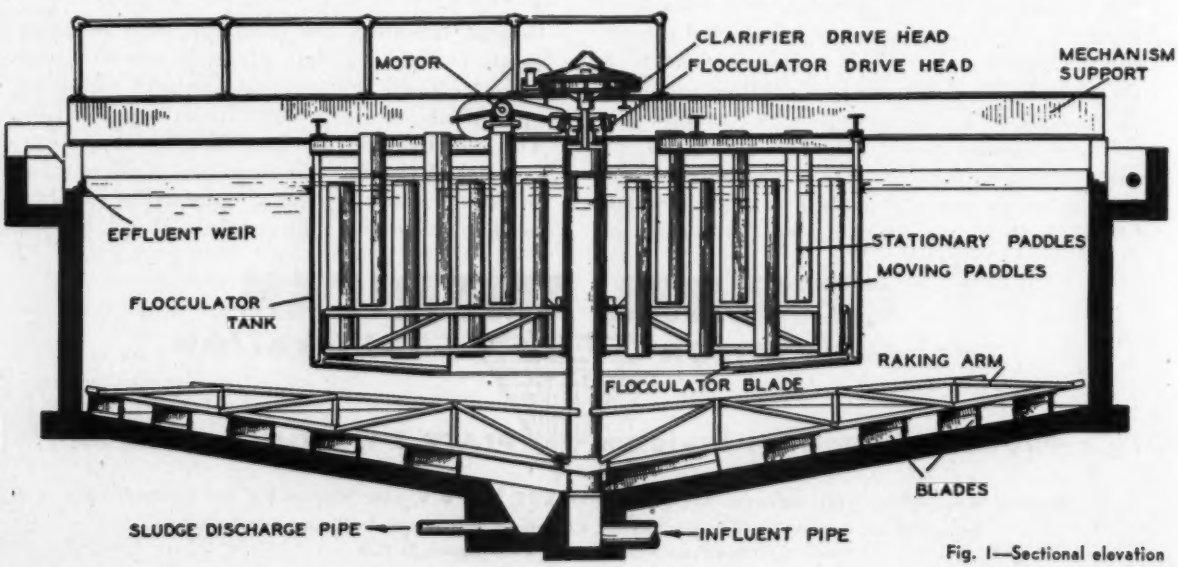

Fig. 1—Sectional elevation

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To meet the unprecedented severity of combat service on U. S. Army tanks, tractors and self-propelled big guns, Gates has developed and built synthetic rubber V-belts to far higher service standards than were ever required of pre-war, natural rubber V-belts!

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  Every improvement developed by Gates for these Army V-belts has also been added, day by day, to the quality of the standard Gates Vulco Ropes which have been delivered to you.

In the case of many other products, you must wait until after the war to get the benefit of war-time improvements. But victory depends upon production—and production depends upon V-belts which drive the producing machines. That is why Gates has been able to pass on to you immediately, in your Standard Gates Vulco Ropes, every V-belt improvement which Gates specialized research has developed for use in the Army's motorized equipment.

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factory performance. In many systems, however, the particles are at a relatively great distance apart and good flocculation without further treatment will not result. When such a system is subjected to controlled agitation which will increase the rate of shear so that the individual particles are caused to collide the rate and excellence of coagulation are increased enormously.

About 1929, The Dorr Company initiated a research program having as its primary objective a study of the effect of mechanical agitation under controlled conditions on the flocculation of suspended particles too small to settle individually at an economic rate. Factors such as size, character, and uniformity of floc and their influence on separation phenomena were investigated, and after fifteen years still constitute a fruitful subject for study. The Dorrco Flocculator and Clarifier used separately for carrying out two essential steps in water treatment resulted from these studies.

The equipment as shown in Figure 1 combines flocculation and clarification in separate compartments in a single circular tank.

The flocculating compartment, which shall be referred to as the inner zones, is concentric with the clarification compartment or outer zone; or in other words, the zone of flocculation is suspended centrally within the clarifier.

The flocculating mechanism consists of a rotating paddle made up of a series of V-shaped vertical blades extending up from two horizontal arms supported from a vertical outer drum. Intermeshing with these rotating blades are four sets of downwardly extending stationary V-blades that are supported from beams above the liquid surface. Two substantially horizontal flat blades set at an angle and attached to the lower end of the rotating paddle serve to prevent segregation of the solids on the floor of the inner zone.

The clarifier or sludge collecting mechanism is supported from an inner drum which also acts as a feed pipe. Conventional type sludge raking blades are used. When required, a rotating skimmer is used in connection with the clarifier mechanism. Both the flocculator and the clarifier mechanisms are rotated at constant but differential speeds through their vertical support drums by a special type of double drive head.

In the standard design, feed is introduced into the inner rotating drum through a siphon feed pipe. It enters the inner zone at the center at the liquid surface through openings in both the inner and outer drums. It then passes to the outer zone through a central opening in the floor of the flocculator tank. The clarifier effluent is discharged over a peripheral weir in the usual manner.

In special cases the flocculator tank may be fed through an overhead feed pipe or through a pipe extending through the tank wall near the liquid surface.

This equipment is constructed in standard sizes from 30 to 100 feet in diameter with the inner zones ranging from 16 to 50 feet in diameter; the volume of the inner zone being about 25% of the total.

The flocculating unit has been so designed that a maximum of collisions between the newly formed flocs and the incoming liquid is obtained. This is accomplished by the moving and stationary V-shaped blades which are so arranged as to give a maximum to and from movement in horizontal planes, while downward vertical movement and attendant short-circuiting is minimized. The horizontal movement is not sufficiently rapid to cause floc break-up.

As a result of the rapid flocculation of the raw solids into heavy, dense agglomerations with a minimum of small flocs, the settling qualities of the solids have been greatly improved.

The well flocculated solids then pass quietly into the outer zone through an opening in the floor of the inner zone, which opening is so proportioned as to reduce to a practical minimum the degree of short-circuiting through the flocculator compartment and to prevent the relatively rapid movement in this zone from being transmitted to the outer zone.

Although the diameter of the flocculating compartment is about half of the overall diameter, the effective capacity in the unit for clarification and sludge concentration is practically equivalent to that of a separate clarifier of the same diameter.

Among the salient features of the Clariflocculator for complete treatment of trade wastes are:

ONE OF 27 DOW CHEMICALS USED BY THE PAPER INDUSTRY

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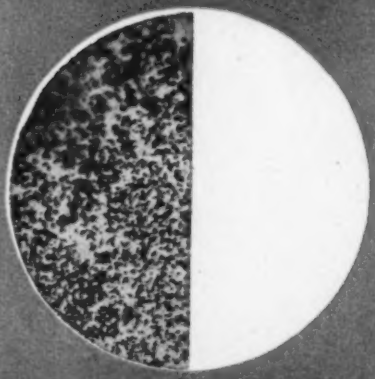
Mold has a special appetite for paint. It likes practically all kinds, but its favorites are water soluble and emulsion types because of their high protein content.

When paint manufacturers presented their problem, Dow technicians gladly accepted the challenge. For they are probably the No. 1 enemy of mold, having fought it zealously for years. The "half and half" circle at the right proves how well Dow research men succeeded in combating mold in paint by mixing Dowicide in it during the manufacturing process. After 30 days' exposure in a humidity chamber, the Dowicide-treated portion remained free of mold. The untreated section on the left of the circle was dark with mold. Paint fortified with Dowicide resists mold even under conditions of dampness such as may prevail in breweries, canneries, dairies, textile and paper mills. The result is better light reflection, less loss from frequent renovations and shutdowns.

Today, there is a total of seventeen related Dowicide products. Each is designed for a special job but all are ready to help you with any mold problem that may exist under conditions special to your industry. Call on Dow to help you combat destructive, expensive mold attacks.



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1. The unit is compact, with a single drive unit for both the flocculation and clarification mechanisms.

2. Because of relatively slow speeds and absence of submerged bearings, maintenance is low.

3. Heavy solids, such as sand, grit, etc., which settle rapidly, cannot accumulate in the flocculation compartment and interfere with the rotating paddle.

4. The method of introducing the well flocculated solids into the clarification compartment minimizes short-circuiting and results in a high over-all efficiency and economy.

5. Sudden changes in flow or water characteristics of short duration are absorbed without materially upsetting the operation or results.

Paperboard Production Qualities of Cereal Straws

HAROLD C. KOCH, Chief Chemist
Auglaize Box Board Co. and Terre Haute Paper Co.

Ways and means of alleviating the scarcity of good straws, the development of satisfactory substitutes, and the development of methods to utilize the straws to the best possible advantage are problems of great importance to the industry.

This paper presents the experiences of a strawboard mill while using the straws of threshed winter wheat, combine winter wheat, rye, spring wheat, oat, rice, and barley, and also presents a comparative evalution of these straws on the basis of mill production. It was found that the straws differed widely in the production attainable with each.

The threshed winter wheat straw was baled from stacks in Missouri, Illinois, and Indiana. These states and Nebraska supplied the combine wheat straw. Most of the spring wheat came from South Dakota, as did much of the rye, oat, and barley straws. A portion of the oat straw came from more local combine harvested fields. Much of the rice straw came from Arkansas.

The threshed winter wheat straw had the usual whole firm stems, few blades, and sheaths and was relatively free of weeds. The combine wheat straw had been exposed to varying degrees of weathering made apparent by the characteristic grey color and it contained considerable weeds and corn stalks. Two varieties of rye straw were received, one of which resembled threshed wheat and the other was soft and fine and much inferior to the first. The sring wheat had finer stems and was often broken and shredded to a fine chaff. Handsful of short fine stem slivers and chaff could often be extracted from the bales without opening them. The oat, barley, and rice straws were progressively softer and had proportionately more blades and sheaths in the increasing order as listed. The combine oat straw often carried many weeds. The rice straw withstood weathering least of all and that which had been stacked was in poor condition.

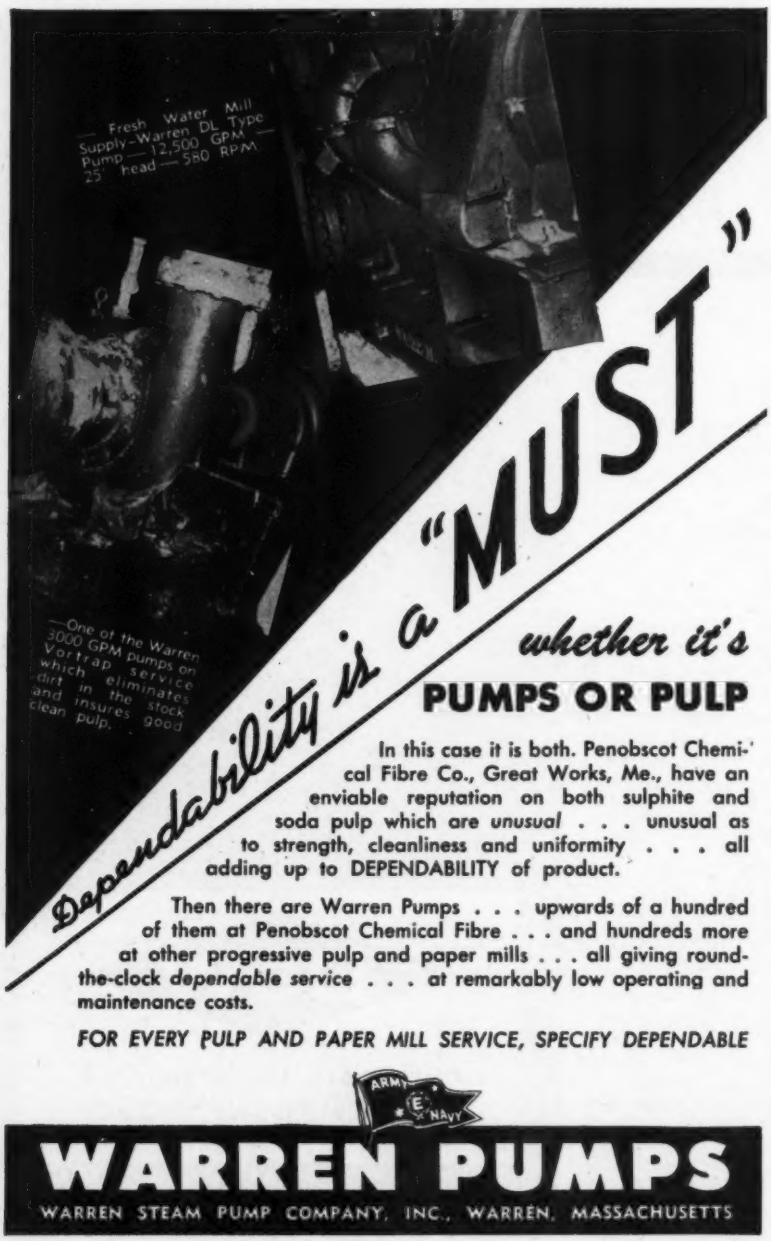
The mill in which the data was collected was conventional in design and used the conventional process. That is, the globe rotaries were followed by beaters with washer cylinders and these by jordans. The two paper machines had two cylinders each and were equipped with suction drum return rolls, light suction press rolls followed by two heavy press rolls.

The use of the seven straws alone and in many proportions in mixtures of two or more provided means of comparing them with one another. The paper machines readily demonstrated the differences.

The soft straws, the spring wheat, oat, barley, and rice, having fine stems and large percentages of sheaths and blades required less drastic cooking. As the proportions of these in the furnish increased, proportionate reductions in concentrations of chemicals in the cooking liquor as well as in the cooking time were made. This was particularly true with barley and rice straws. The softer straw pulps also required less beating and refining They required more washing, however, since the beater water with these remained dark and cloudy and their poor water drainage properties, so pronounced on the machines, was very evident in the poorer efficiency of the beater washer cylinders.

Water draining from the harder straw pulps in the beaters became fairly clear after a period of beating and washing, whereas, the water draining from the soft straw pulps continued to carry large quantities of very fine suspended matter.

The barley straw, particularly when new, showed a tendency to give a stock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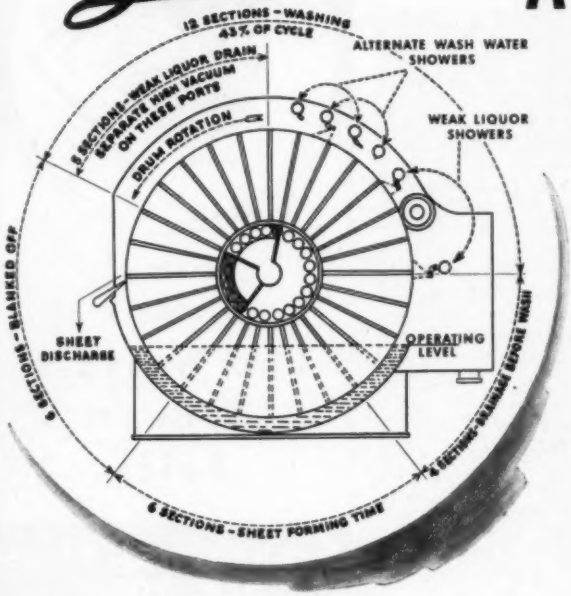
Look into the ADVANTAGES OF THE SWENSON-NYMAN Pulp Washer


12 SECTIONS - WASHING
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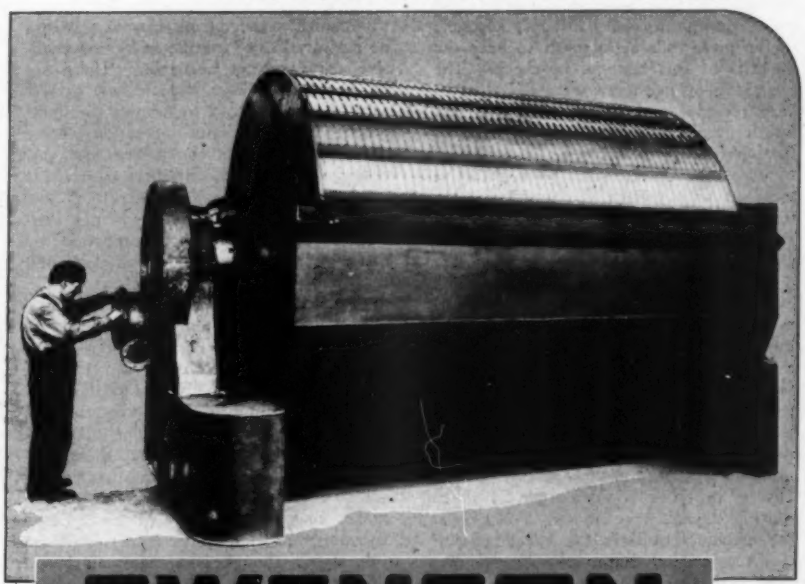
ALTERNATE WASH WATER SHOWERS
2 SECTIONS - WEAK LIQUOR DRAIN SEPARATE HIGH VACUUM ON THESE PORTS
DRUM ROTATION
WEAK LIQUOR SHOWERS
SHEET DISCHARGE
OPERATING LEVEL
6 SECTIONS - BLANKED OFF
6 SECTIONS - DRAINAGE BEFORE WASH
6 SECTIONS - SHEET FORMING TIME

The diagram above shows the function of each of the 28 sections in the Swenson-Nyman washer, and indicates the pertinent features and operating principle.

This combination of features is found only in the Swenson-Nyman washer: Two-stage countercurrent washing on a single drum—separate handling of strong and weak liquors—independently controlled vacuum on each stage with uniform distribution across the entire sheet at all times—pulp pickup at low level—washing area twice as large as the sheet forming area—low point sheet discharge—no backwashing.

Newly completed Swenson-Nyman washer—now in operation.



Swenson-Nyman washers for kraft, sulfite, and soda pulp mills are made in capacities up to 200 tons per 24 hours. The size best suited for the work to be done is determined by Swenson Engineers after an analysis of each mill's requirements. For complete information write for Bulletin No. F-104.

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containing a waxy material which coated the machine press rolls and caused "pick-ups." It was necessary to apply kerosene to the press rolls at intervals to keep the deposits of this material in check. The seed hulls of rice straw were found to be very resistant and practically unchanged by the cooking liquors. Many reached the machines unchanged.

Many mill experiments were made in attempts to overcome the inferior qualities of the softer straws, in some measure at least. The cooking formulas were changed from one extreme to the other and different rotary filling and steaming cycles were tried. Changes were made in customary beating and washing procedure and various different procedures in refining the stocks were used to give different fiber length and freeness characteristics. The alkalinity of the stock was neutralized to a pH near neutral before refining in several experiments to reduce, if possible, the slowness of the stocks. Several experiments were made in which wetting agents were added to stocks at the machines to learn the effects of surface tension and diatomaceous earth filter aids were also investigated. The results of these experiments were all negative, the improvements in the softer straw stock production qualities, if any, were negligible.

The larger percentage of fines and of blades in the original spring wheat, barley, and rice straws and the larger quantities of fine suspended matter liberated from their pulps in the mill beaters appears to have contributed to the conversion losses and to the lower yields which were observed with these straws.

It appeared that the reduced machine speeds helped to minimize differences in finished board quality. However, the quality of board made from the softer straws did not equal that made from the winter wheat and rye straws. The former tended to be more brittle.

On the basis of, and within the limits of one strawboard bill's experience, the cereal straws decrease in comparative value as strawboard fibrous raw materials in the following order: threshed winter wheat, combine winter wheat, rye, spring wheat, oat, rice, and barley. They differ widely in the machine speeds and production attainable with stocks prepared from each. Experience indicates that these results are attributable to differences in drainage rates of the prepared stocks. When the various straws are used in mixtures of two or more, the properties of the stocks prepared from them remain the same and the results are directly related to their values, in proportion to the composition of the mixture.

Wartime Damage Claims Related to Fiber Shipping Containers

EDWARD DAHILL, Chief Engineer
Freight Container Bureau
Ass'n of American Railroads

The loss or damage which has occurred and is occurring daily in domestic shipments to articles packed in fiberboard containers cannot be fully evaluated, nor can the consequences of using fiber containers below par both in quality and quantity of materials, during this war period be measured since specific and comprehensive data are not available. There are some data, however, which will be referred to and quoted to support the opinion of claim and claim prevention officers of the carriers that the present use and re-use of fiberboard containers are responsible for a most decided increase in loss and damage. This opinion is not confined to rail traffic but is also expressed by officers of the express agency and by officers of over-the-road trucking concerns.

With the country fighting a major war in two hemispheres, approximately 12,000 miles apart, and the necessity of shipping by water some 14 tons of war material for each man landed in these two areas, a tremendous supply of shipping containers has been demanded. The manufacturers of containers have met these sudden and almost overwhelming demands as far as war material is concerned but when it has come to taking care of the domestic economy and trade at the same time, there just wasn't enough good materials immediately available. It has been an uphill pull to try to meet these joint demands and it is certainly to be hoped that there will be an improvement in the very near future, especially in the quality if not in the quantity, and in the workmanship of fiberboard containers used in domestic shipment.

To answer the demands of domestic business, various agencies of the government after studying the matter urged the co-operation of all concerned in using, re-using, and spreading as far as possible, the supply of materials for making fiberboard available to the container manufacturers. That meant, in effect, cutting the quantity of material in a container, and, unhappily, the quality was cut as well. These actions could not but reduce the strength and adequacy of the containers down to and frequently below the safety point. However, the question might well be asked here as to why is it some container manufacturers have been able to continue to produce reasonably good containers while others turn out containers much below previous standards. The opinion has been expresesed that possibly advantage is being taken of the situation and poor containers are being furnished without regard to the safety of the goods of those using those containers.

A reduction in the quantity of the materials making up the containers was bad enough, but when recommendations were also made to reduce drastically, or to eliminate, inside packing or cushioning material which had been judged or proven by tests and experience in the past as being needed, then indeed did loss and damage begin to mount. Add to this, the re-use of containers not adequate when new and first used and a most unsatisfactory condition develops. It has been held for some time that articles well and properly packed and cushioned on the inside but in a mediocre shipping container will ofen give better results than

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Write for Bulletin No. 8

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articles poorly and inadequately protected on the inside and shipped in a good container. This applies particularly to fiberboard containers which need interior support to protect the contents and to withstand outside pressures and impacts. It is what is inside and how used and applied that really protect the contents.

The shortage of containers has promoted the re-use of them, frequently not once but many times until they may be in a very dilapidated condition offering but little protection to the contents and posing a problem to the transportation agencies as to their acceptance. This problem is not confined to re-used containers only, for some new containers although billed as boxes are not, in effect, much more than bales or bags from the standpoint of protecting the contents from pressure and impacts.

It has been said that such shipments should not be accepted. What is to be done if the shipper truthfully states that the containers are the only ones available to him? At some stations shipments in poor condition are being returned to the shipper and yet there are thousands of shipments loaded directly by the shipper which thus come into the possession of the carrier and would be most difficult to re-use or return.

This manner of re-used containers has presented another problem not necessarily involving damage or the adequacy of the containers but which is causing all kinds of trouble. This refers to double, and sometimes, triple marks and addresses stencilled on the containers or typed on stickers, none having been eliminated or defaced. In 1939, the claim payments for unlocated loss-freight in packages, for all commodities, were 3.3% of all payments; in 1943, this item accounted for 7.0%; and for the first 6 months of 1944, amounted to 8.8% and it is still growing. It is under this cause that most of the claims for loss because of shipments going astray or not being delivered are paid; and, hence, this increase in payments reflects the non-delivery of freight largely due in mismarking, improper marking, and double or triple names and addresses.

Quoting from a letter written by a freight claim agent of a mid-western railroad:

"As you know, the carriers are having considerable trouble with canned goods, and claim payments are mounting year after year. Shippers who formerly used fiber boxes are now using corrugated, and a very poor grade at that. To make matters worse, spot sealing or no sealing at all is the practice followed by some shippers, and then to further complicate the problem, the loading and stowing are not done efficiently. New help, indifference, lack of supervision, and shortage of material for taking up space, etc., all enter into the picture. Some shippers are following the 'Bonded-Block Method,' some use divided sheets, but the majority load cases in straight line, loose, one package directly on the other with apparently little effort made to take up the slack or insert necessary space-takers to keep the cases from shifting."

That briefly presents the picture and gives some of the causes for the marked increase in loss and damage payments. In 1939, the rail carrier paid out a total of $18,885,330; in 1943, $42,050,364, and in 1944 it is anticipated the total will amount to $60,000,000 or more. Of course, these figures do not give what is wanted here for they are not specific and reflect the increase in traffic over these years. For the first 4 months of 1944, as compared with the same months in 1943, the revenue increased 3.4% while the claim payments increased 43.3%.

What can the container manufacturer do, even in spite of the restrictions? Examination of many containers shows that the manufacturer's joint is not being well formed as frequently the joint is ⅛ to ¼ inch open; the gummed tape is not well adhered to the containers, readily pulls off, and may be short at least an inch at each corner. There is a marked variation in the dimensions of the containers, the corrugations adhere lightly to the liners or there are frequent skips and bare spots, and the bond with the liners is broken at the scores to a greater extent than good manufacturing practice would justify. These are items that can be corrected by the container manufacturer.

The greatest faults on the part of the shippers are failure to close and seal the boxes, random spacing of staple, not placing the staples near the outer edges of the flaps and near where the flaps butt,

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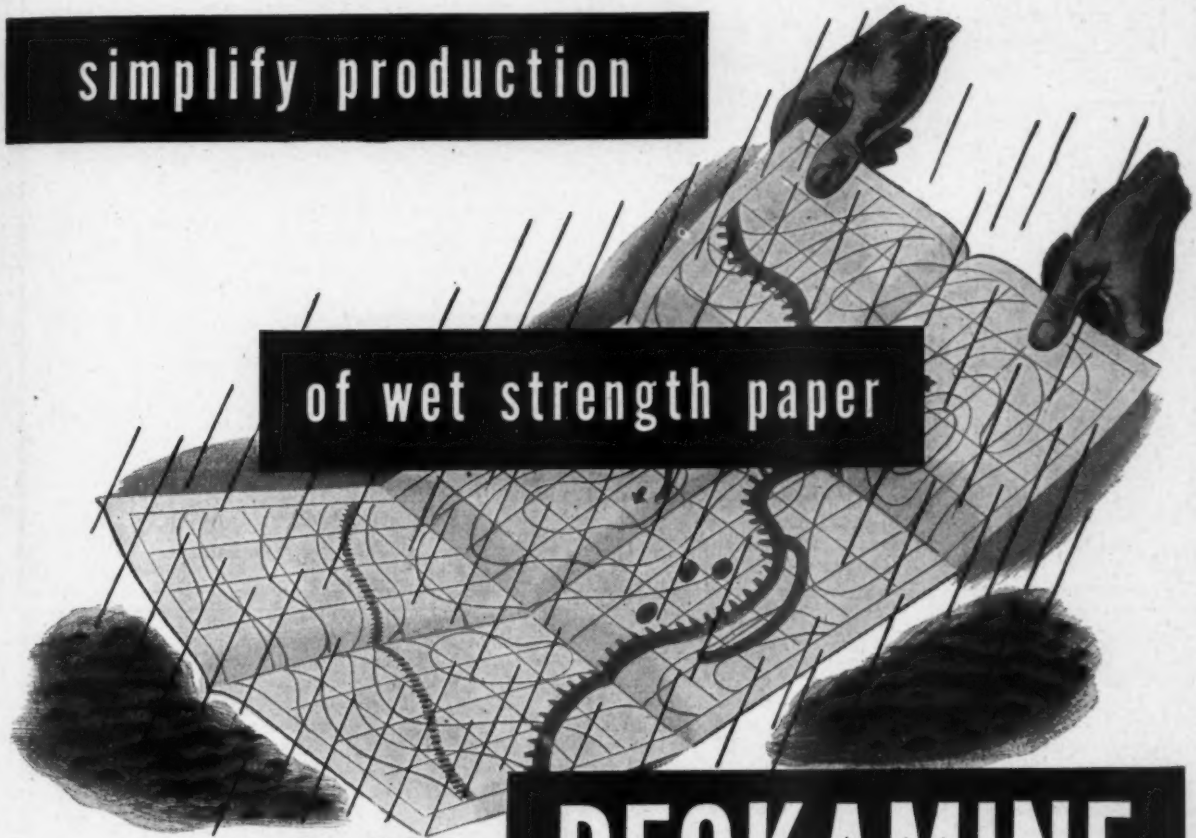

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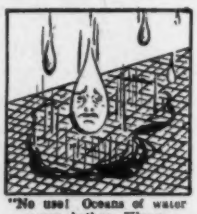

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spot sealing of adhesives and not holding the flaps down or together while the adhesive is setting; using short strips of gummed tape that do not cover the entire length of the flaps or only partly wetting the gum, and not pressing or rolling the tape against the flaps. Even with these shortcomings, better results might be had if the containers were trued up, the outer flaps butted and held there until the adhesive tape had set, but, unfortunately, they are not and the flaps frequently open in handling or in transit. The box cannot offer the resistance to distortion it should, and it becomes difficult to load the boxes snugly and tightly in the car when shipped in carload lots, thus causing loose loads, particularly lengthwise of the car, which almost always lead to trouble.

All these items are accentuated when second-hand containers are used, and, in addition, many articles are packed in containers in which they do not fit. As little attempt is made to take up this slack space, the articles are free to move about and damage themselves.

Heavier loading has not been mentioned as a possible cause of increased loss and damage. It does have an effect, but it would not be so adverse if the containers were up to pre-war par. Neither has railroad handling been mentioned. It is known that cars are being handled rougher and faster than previously, and that station operations are not supervised as well as formerly; and for which there is no apology as the carriers are doing their best under trying conditions. The real point is that greater hazards are being met with in all kinds of transportation and normally there should be greater safeguards to meet this condition; but, unhappily, the containers and inside protection, instead of being increased to meet this challenge, like they were for war shipments, have been decreased.

What is ahead in the postwar period? The author does not know. Certainly, the fiber container manufacturers have shown they can produce good containers, and the experiences of shippers, receivers, rails, trucks, and the express agency, demonstrate that the present domestic containers and the inside packing practices and materials are not adequate and below the margin of safety. The war has proven that there is a limit to our manpower and our resources and that we cannot continue to be careless or wasteful After the war, it is certain that previous wastages of time, labor, and material, because of loss and damage in transportation, cannot and will not continue to be looked upon with complacency.

A Paper Board Mill's Attack On Stream Pollution

THOMAS E. BROOKOVER, Chemist
Downingtown Paper Co.

As early as 1910, the Downingtown Paper Company was using an electrolytic process in conjunction with sedimentation for clarification of the waste water. An effluent of exceptional clarity was obtained, but the method was discontinued because of high maintenance costs, constant attention required and excessive foaming when the clarified water was recirculated on the machine.

At present there are three board machines in operation. Each machine is contained in a separate building, and the layout of the individual units is such that the handling of the waste water is more complicated than would be necessary with a more compact arrangement.

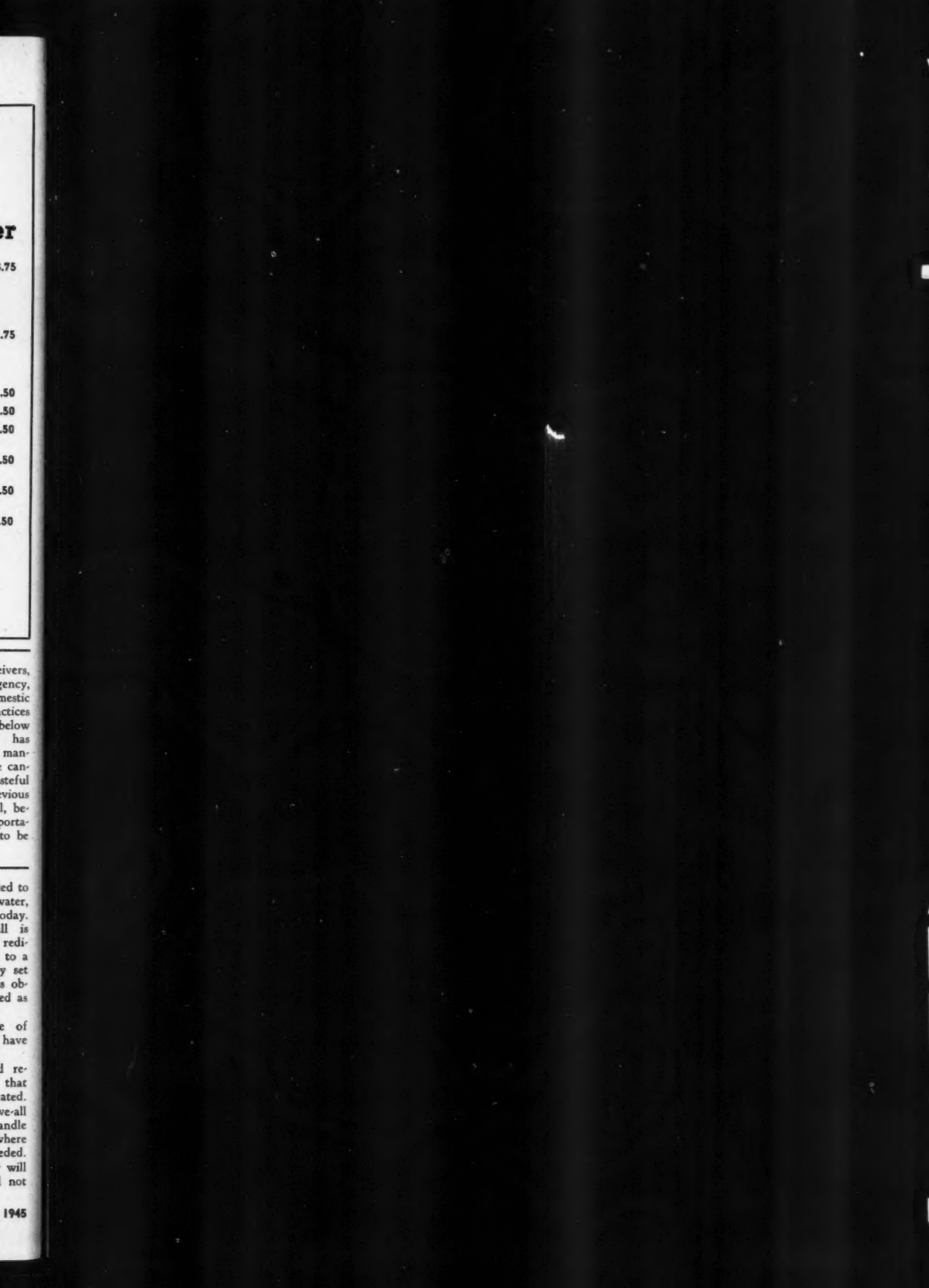
In 1924, a Bird save-all was installed to reduce the fiber loss in the waste water, and this equipment is in use today. Thickened stock from the save-all is pumped to a mix box in which it is rediluted with raw waste before passing to a two cylinder wet machine specifically set up for the purpose. The sheet thus obtained is 25% dry fiber and is re-used as filler stock.

From experience with this type of equipment, the following conclusions have been drawn:

1. If waste treatment is to yield reusable fiber, it must be so located that material handling will not be complicated.

2. Units such as the Bird save-all should be placed where they will handle wastes of higher concentrations and where their volume capacity will not be exceeded.

3. Although a thickener cylinder will remove long fibers efficiently, it will not



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remove finely divided solids and colloidal materials as is necessary if the receiving stream is to be unaffected.

4. As implied by the above points, the maximum benefits are not realized from the present save-all installation.

In 1930 a Link Belt sedimentation unit was installed to treat the waste water of two adjacent mills. The installation was to serve three purposes: (1) to recover suspended solids for re-use in filler stock; (2) to obtain a fairly clear white water for recirculation; and (3) to reduce the ultimate pollution load in the final waste.

The so-called clear water is used for the most part in the chip mill on felt showers and as stock process water.

For several years, alum was fed to the raw waste entering the basins to clarify the water as much as possible. Soda ash was added to the effluent to obtain a neutral water for re-use. After final waste treatment basins were installed to handle the combined wastes of all mills, this practice was discontinued—for without coagulation the effluent was suitable for its intended use and the extreme fines and colloidal materials in the overflow were taken care of in the final waste treatment works.

A difficulty encountered, especially when alum was used, has been that of "heating" stock. Much effort is required for its removal when the condition is aggravated. It may be because of one or several causes: air leakage into the supply pump, low rate of sludge removal which allows a build up in the basins, or collection of the solids in stagnant pockets were decomposition may occur.

The advantages of such a system appear to be:

1. The relatively small number of working parts, resulting in infrequent mechanical failure and low maintenance cost
2. The efficiency of suspended solids removal

Its disadvantages are:

1. The possibility of sludge overload stalling and breaking the scraper chains.
2. The stock or sludge may float rather than settle
3. The objectionable odor caused by the stagnant sludge when decomposition takes place.
4. In the case of this installation, the manual supervision required for the amount of stock reclaimed

The Link Belt system and the Bird save-all yielded a final waste low in long fibered stock but containing fines and colloidal material which affected the stream. Immediate action was desired by the Pennsylvania Department of Health and straight sedimentation was suggested.

The installation, completed in 1937, consists of two concrete basins operating in parallel. Each basin is 400 feet long, 60 feet wide at the top, with sloping sides to a 40-foot wide bottom, 7 foot maximum depth, and a volume of approximately 1,000,000 gallons. The combined volumes were to give a 24-hour retention: this is theoretical only, for dye tests have shown that water passes from inlet to outlet in 1 hour.

Before entering the stream combined effluents from the two basins pass into a common channel and over a rectangular weir on which is mounted a float operated flow recorder.

Ferric sulphate as well as a carbon-alum combination have been tried in place of alum alone as a coagulant, but straight alum has proven the most satisfactory, and the cheaper grades are used when available. The raw waste contains sufficient alkalinity, and the use of lime or soda ash in conjunction with alum has not proven beneficial. Experiments are being conducted at present with activated silica as a coagulant aid, but no definite conclusions have been drawn. An alum dosage of 100 to 135 ppm (6 to 8 grains per gallon) has been necessary for best results in removal of turbidity.

Operating conditions of the basins vary from time to time, depending on the volume of production and types of board produced.

These basins have operated above 97% efficiency at times simply because the raw waste contained excessive amounts of suspended solids. The actual suspended solids content of the effluent best expresses the performance of sedimentation basins. Results ranging from 4 to 60 ppm suspended solids have been obtained in the effluent under normal operation.

For proper maintenance of operating efficiency the sedimentation basins must be cleaned every three or five months, depending upon the load handled.

The following favorable features of straight sedimentation can be noted:

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1. Simplicity of control
2. Absence of mechanical parts in normal operation
3. High efficiency in removal of suspended solids as long as proper operation can be maintained

Unfavorable features of straight sedimentation are as follows:

1. It is uneconomical for there is a definite loss with no return
2. Handling the settled sludge is an expensive item, especially for a plant of our type
3. Waste passing through the basins comes in contact with the relatively stagnant body of settled solids and thus may carry off further pollution into the stream.
4. The basins may be upset by atmospheric conditions. Lowered atmospheric pressure is sometimes accompanied by large masses of sludge rising to the surface. High winds can carry suspended solids to the oulet.
5. The inclusion of what amounts to batch operation in line with the continuous flow is generally unsatisfactory as well as dangerous. In fact, within the past two years a series of events prevented cleaning of the sludge pit in time, which in turn prevented cleaning of basins, resulting in overloaded basins and discharge of suspended solids to the stream.

The unfavorable features overbalance the favorable, and this fact led the company to seek a more satisfactory solution of the problem.

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Samples of waste were submitted to Infilco, Inc., for examination, and they expressed confidence in their ability to handle the problem. Since this was the first application of the Accelator for treatment of paper mill wastes, a unit was installed on a trial basis.

The principle of this equipment is that of building up floc particle size by adding the raw waste and coagulant to a fairly concentrated slurry with appreciable agitation and thus increase the ultimate rate of separation of the clarified water from the solids. This separation occurs in the outer quiescent portion of the tank: the clear water rises from the slurry bed to the overflow; part of the slurry recirculates to receive the raw waste and part is drawn into concentrators from which the solids are removed in the form of sludge through electrically controlled discharge valves operating on a desired time cycle.

Two appealing features with references to the mill's problems are the constant circulation within the unit, preventing stagnation and decomposition, and the continuous removal of solids. The solids, as sludge, are returned to the filler stock system in one of the mills.

The equipment installed at the plant is contained in a wooden tank with stone and concrete foundation. The tank is 38 feet in diameter, 16 feet 9 inches deep (maximum), and has a capacity of 130,000 gallons. The unit is designed to handle a maximum flow of 3,000,000 gallons of water and 6,000 pounds of suspended solids per day. It has been installed in series with and ahead of the final sedimentation basins.

Before going farther, it is wise to say that the unit has not been continually successful. The fault has not been wholly that of the equipment. Because of an unfortunate circumstance within the mills, the solids load on the unit was often four times greater than that on which the design was based. Solids were not removed rapidly enough and build up in the unit, decreasing and finally preventing the desired recirculation of slurry. Consequently, operating results to date are not considered final.

The manufacturer of the equipment suggested the advisability of various design changes and made arrangements for the same. Generally, the modifications centered on improving circulation of the slurry and removal of sludge by decreasing flow resistance. These changes are in progress at the time of this writing. It is understood that more recent installations for similar work are designed in accordance with these modifications.

A general discussion of results obtained is interesting. With a clean unit excellent results were obtained, the flow was clear and suspended solids concentrations of less than 30 ppm were obtained in the effluent. The sludge discharged varied from 0.3 to 0.6% and averaged above 0.4% consistency. These results were obtained on flows of raw waste not exceeding 2,500,000 gallons per day and containing up to 1,000 ppm suspended solids.

The relatively large volume of sludge required for solids removal under these conditions could not be handled directly in the filler stock system of the mill. An interesting solution of the problem was to pipe the sludge directly to the two cylinder wet machine normally used in conjunction with the Bird save-all. Indeed, it was the sight of the continuous sheet of reclaimed stock coming off the machine that emphatically drove home the point that stock losses were more than mere laboratory reports and that the waste system was definitely overloaded.

For a period of two months a portion of the sludge, containing up to 4,000 pounds of solids per day, was pumped to a filler stock system handling 40 to 50 tons of stock per day with no deleterious results in the mill production.

With the Accelator finally in operation a satisfactory method of suspended solids removal is expected. The sedimentation basins will remain as a follow-up to the guarantee a final effluent of maximum clarity, but their cleaning and subsequent waste solids handling will be reduced to a minimum. From past performance it is believed that the Accelator will operate without manual control; daily checks will be necessary, but these will be made by the laboratory. Occasional drainings will probably be necessary to remove accumulated gravel, metal, etc, but proper blowdown lines should take care of this in later models and may yet assist in ours. The power cost of the 5 hp. agitator motor is certainly acceptable. Regulator checks on lubrication of bearings, as is necessary for all machinery and pumps will be required. However, unless some unforeseen factor arises, the advantages of the method definitely outweigh the disadvantages in the present case.

Agricultural Residue Pulps for Corrugating—Effects of Weathering of Various Cooking Conditions

S. I. ARONOVSKY[1], J. O. YOUNGER[2], and G. H. NELSON[3]

This paper describes preliminary work on the evaluation of several agricultural residues for strawboard manufacture, including proximate analyses of weathered and sound straws, and some pulping data. A portion of this work was discussed informally at the Straw Conference at the TAPPI meeting in New York City, February 1944.

The materials included in this study were sound and weathered wheat and rice straws, soybean stalks, hemp hurds, flax shives, barley straw, sugarcane bagasse, and sedge or "wool" grass. The weathered wheat straws were obtained from several locations in a commercial 2-year-old rick in Ohio. The weathered rice straw (presumably from Arkansas)

[1]Chemical engineer, in charge of Pulp and Paper Section, Agricultural Residues Division; [2]Paper Technologist, Pulp and Paper Section; [3]Chemist, Pulp and Paper Section, Northern Regional Research Laboratory, Peoria, Illinois, one of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

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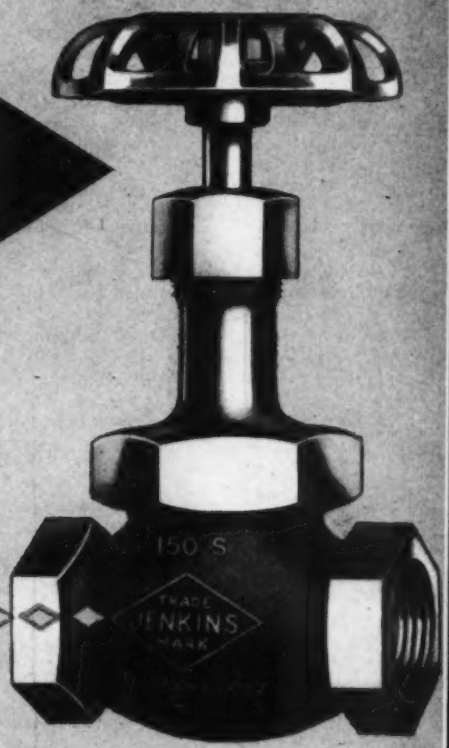

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was taken from a 2-year old rick in Indiana. The sound wheat straws came from South Dakota and central Illinois. The barley straw was stack straw from Nebraska; the soybean stalks came from central Illinois; the hemp hurds, from southern Wisconsin; the flax shives, from southern Minnesota; and the Louisiana bagasse, from a bale stored under normal commercial conditions. The sedge grass, *Scirpus cyperinus*, was obtained from a Wisconsin county agent who estimated that about 50,000 tons of this material are available in 10 counties alone in the lowlands of that state. All materials were received in air-dried condition, except the badly weathered wheat straw which was air-dried on arrival to about a 20% moisture content.

The agricultural residues were cooked in a 12-gallon, steam-jacketed, cylindrical, tumbling, stainless autoclave, rotating at 1 rpm. The autoclave was charged with the raw material, chemical and water, and the charges were cooked for definite periods at the various temperatures which were generally attained in 15 minutes after steam was turned on. At the end of the cooking period, the pressure in the autoclave was relieved through a condenser in 15 to 25 minutes, after which the liquor was drained from the autoclave through a muslin bag (to recover any fines, straw, or pulp removed with the liquor). The autoclave was then refilled with warm water, and again drained after several minutes. The cooked material was then discharged into a stainless steel container, covered with water, and allowed to stand overnight.

The water was drained from the cooked residue and the latter, along with the material from the muslin bag, was fed into a 12.5-pound washer-beater with approximately 200 pounds of fresh water. (The washer roll was covered with an 80-mesh wire cloth.) After preliminary disintegration of the stock using a clearance of more than 0.010 inch between the beater roll and bed-plate to obtain good circulation, the clearance was reduced to 0.003 inch for a 10-minute period to defiber the stock. The beater roll was then raised to a clearance of about 0.010 inch, and the stock was washed with approximately 200 pounds of water. The recovered wash water was weighed and analyzed for total solids. The yield of washed pulp was obtained by making an approximately 2% suspension and then determining the actual consistency. The strength characteristics of the pulp were then determined, using the TAPPI beating, sheetmaking and testing methods. The handsheets were conditioned at 70 Fahr. and 50% relative humidity prior to determining the basis weight, density, tear resistance, and bursting and tensile strengths.

Pulps obtained on cooking with NaOH alone and with NaOH plus Na_2S had, as anticipated, better strength characteristics than were shown by the lime-cooked pulps.

The threshed, sound Illinois wheat straw gave a somewhat lower yield of washed pulp than was obtained from combined straw, but the strength properties of the two pulps were similar. This threshed straw was exceptionally free from dirt and weeds, and although it contained considerably more chaff and fines than combined straw, it had only slightly less culm material (53%) than was present in the combined straw (57%). The sample of South Dakota threshed straw (hard, red spring wheat), however, contained 10% weeds and dirt and an exceptionally large amount of chaff and fines (40%). The low yields and strength properties of the washed pulps from the South Dakota straw are, therefore, quite in order. It is quite possible, of course, that the low pulp yields from this straw may have been partly caused by the nature of the straw itself, which may be quite different in physical structure, composition, and type and size of fiber from winter wheat straw. A comprehensive study of these properties of vairous straws and other residues is in progress at this Laboratory.

The badly weathered straw was practically useless as a source of pulp, and its use in admixture with sound straw for pulping would only lower the value of the latter material. On the other hand, the slightly-weathered wheat straw gave results practically identical with those obtained from sound straw, indicating that this material had suffered little or no decomposition during storage for 2 years in a protected location.

Sound rice straw gave practically the same yields of total and washed pulps that were obtained from wheat straw, but the rice straw pulp had lower strength properties, especially bursting strength. The weathered rice straw yielded less washed pulp with still lower bursting strength, but the decrease was not so large as was expected from a visual examination of the straw.

Barley straw gave lower yields of pulp, which was weaker than wheat straw pulp but somewhat stronger than the rice straw product. It is evident that barley straw must be tbe cooked under milder conditions than either wheat or rice straw. The barley straw pulp tended to hydrate more easily, with a consequent decrease in drainage rate.

Soybean stalks required considerably more chemical to yield a product which could be defibered by beating. The pulp was weaker than any of the straw pulps tested. The variation in amount and type of chemical used with the soybean stalks caused differences in yield but little or no change in the strength properties of the pulp produced. The relative shortness of the soybean stalk fiber may be largely responsible for the lack of strength in the pulp.

The sugarcane bagasse gave somewhat larger yields of washed pulp than were obtained from wheat straw under similar pulping conditions. The begasse pulps were weaker, however, and resembled the rice and barley straw pulps in strength characteristics.

Hemp hurds and flax shives were similar to soybean stalks in requiring considerably more chemicals for pulping. While the hemp hurd pulp had strength properties similar to those of the straw and bagasse pulps, the flax shive pulp was by far the weakest of any of the pulps tested. The sedge or "wool" grass was not softened sufficiently by the lime-caustic treatment used to allow it to be defibered in a beater. Larger amounts of alkali gave a relatively low yield of pulp with fair strength characteristics. The sedge fiber appeared to be somewhat shorter than wheat straw fiber.

It is apparent from the preliminary work that wheat straw, particularly from the soft winter wheat of the mid-central states, was the best of the raw materials examined for the production of corrugating paper or board pulp.

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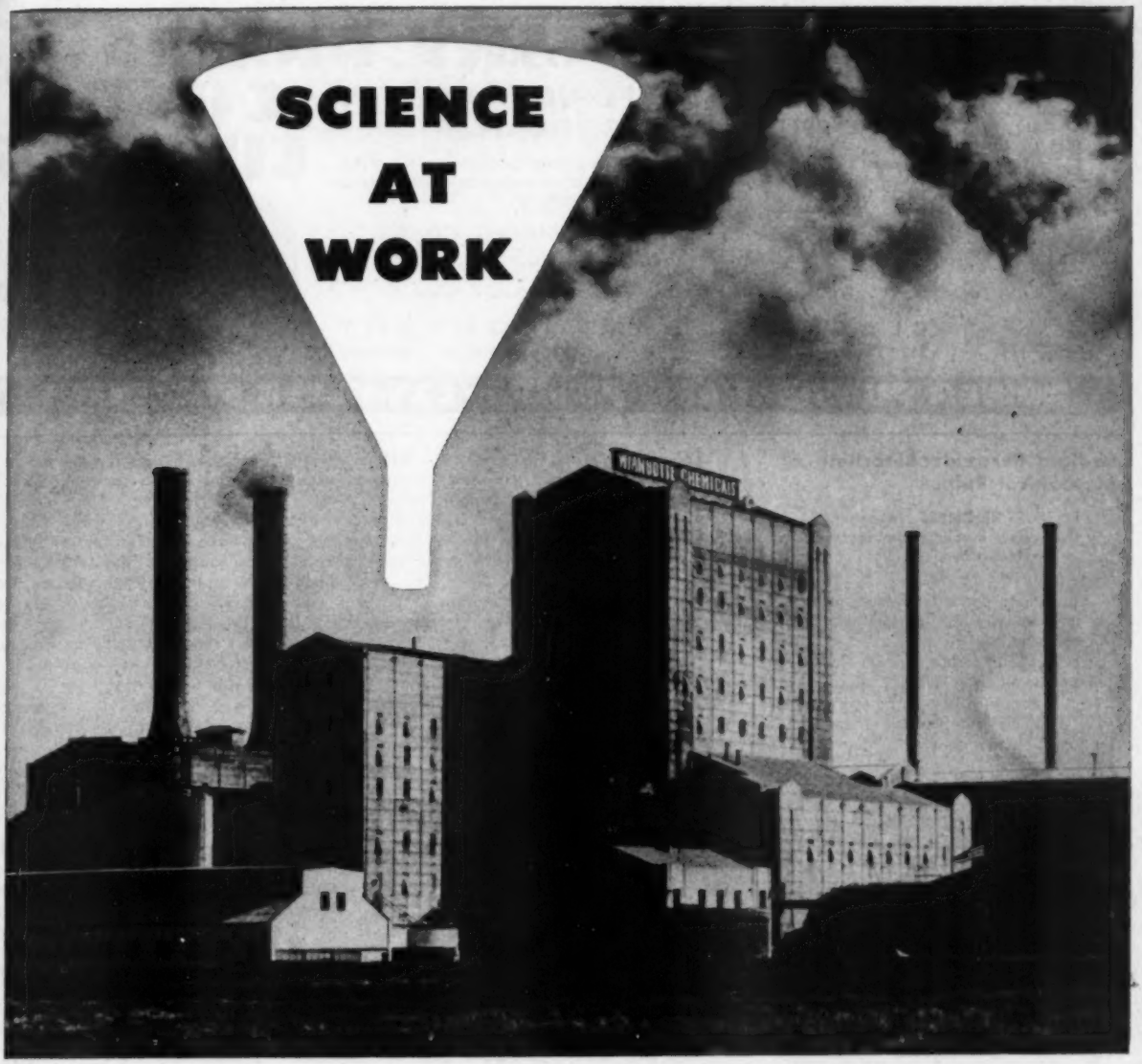

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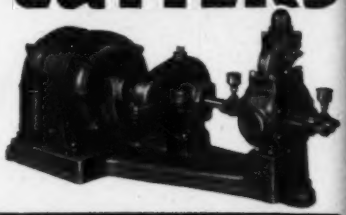

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Sodium Peroxide Bleaching of Mechanical Pulps

J. S. REICHERT, Manager,
Peroxygen Products Development,
Electrochemicals Dept.,
E. I. du Pont de Nemours & Co., Inc.

The sodium peroxide process for bleaching mechanical pulps includes the following operations:

1. Rapid and thorough mixing of the sodium peroxide bleaching solution with the pulp in controlled proportions.
2. Storing the peroxide treated pulp long enough to permit bleaching to go to completion.
3. Treating the peroxide bleached pulp with neutralizing and reducing agent, such as sulphite cooking acid.

In a typical operation of the process, unbleached groundwood from the deckers is delivered at a constant consistency and a measured rate into a mixer where it is mixed with the peroxide bleaching solution in controlled proportions. The bleaching solution is prepared by dissolving sodium silicate and sodium peroxide in water and adding enough sulphuric acid to adjust the solution to the proper alkalinity. Small amounts of Epsom salt are mixed with the bleaching solution and also with the pulp slurry to stabilize the bleaching action.

The peroxide treated pulp passes continuously through a tower or is retained in a series of holding tanks; here the bleaching action goes to completion.

The bleached pulp is neutralized and the traces of residual peroxide are reduced by a treatment with sulphite cooking acid. The bleached and neutralized pulp is ready for delivery to the beater supply chest for use in the paper machine furnish.

Spruce, balsam and poplar are known to react favorably to bleaching with sodium peroxide.

Mechanical pulps, with their high bulk, good opacity, uniform sheet formation, good printing properties, and low costs, are particularly applicable where a short fiber is desirable, where extraordinary strength is not essential, and where an exceptionally long life is not required. Bleached groundwood can be used with technical and economic advantages in the production of a range of papers such as book, catalogue, directory, mimeo, tablet, tissue and some specialty papers.

Improvement in brightness is the outstanding result of the bleach treatment.

The stability of groundwood to sunlight or the ultraviolet lamp is not improved to an appreciable degree by the bleaching treatment. Stored away from light the bleached product is fairly stable; a drop in brightness from 67.2 to 66.4 was observed in a storage test of over 2 years.

The loss of 2 to 3 points in brightness, usually observed over the paper machine with unbleached groundwood, is normally not encountered with bleached groundwood.

The opacity of groundwood is very nearly the same before and after bleaching.

High percentages of bleached groundwood can be used in furnishes to produce papers in which the properties of high opacity and high brightness are combined. Rhodes (*Paper Trade J.* 118, *No.* 14: 23, *April* 6, 1944) reports that a 62 pound sheet containing 60% bleached groundwood has the same opacity as a 75 pound free sheet.

The bulking properties of groundwood are not changed by the bleaching treatment.

The strength of groundwood is not increased or impaired by the bleaching treatment. However, data on paper strengths indicate a slight trend toward increased strength with the bleached pulp.

Groundwood gives about the same results in freeness tests before and after bleaching. While the freeness of groundwood is not improved by bleaching, nevertheless, the working properties are better and the draining rate on the paper machine is higher with the bleached pulp.

Bleaching "mellows" the pulp and gives improved formation on the machine. The finished paper has a smoother and more velvety feel and does not show the harshness frequently associated with unbleached groundwood sheets. It has less fuzz and lint; it is more homogeneous and is finer in texture than book grades made with unbleached groundwood.

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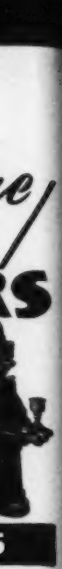

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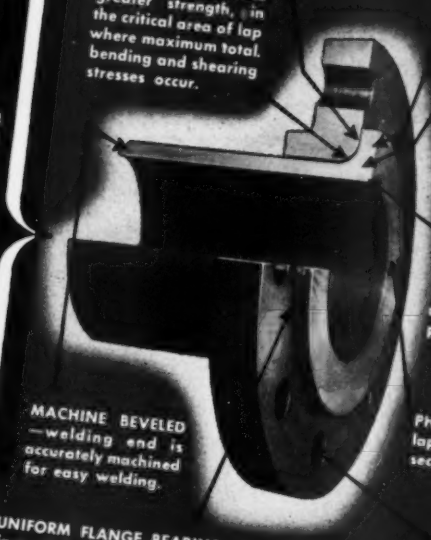

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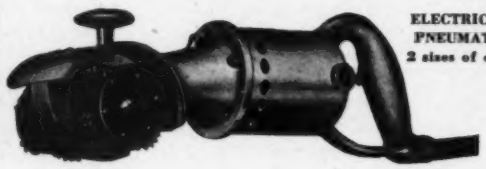

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in unbleached groundwood are softened and largely disappear in the bleaching treatment.

The absorbency toward oil is high and rapid. When inks dry by absorption this is a valuable property, e.g., in a high speed rotary letter-press and in mimeograph paper where good absorbency, coupled with body and opacity are particularly desirable.

Water absorbency and retention of water absorbency with age are improved by bleaching. This property is desirable in tissue, towelling, and allied products.

Groundwood has a resilience which permits uniform printing at lower pressures; this property is enhanced somewhat by the bleaching treatment.

In the production of groundwood the fiber yields are high (about 95%) and the weight loss in the sodium peroxide bleaching process is low (1% or less).

The following cost estimates are based largely on laboratory data, confirmed to some degree by experimental plant runs and in a limited way by mill operations.

The cost of chemicals for bleaching groundwood is about $3.80 per ton (air-dry) for a 6 point increase in brightness; and about $6.50 per ton (air-dry) for a 10 point increase in brightness.

With brightness increases of 6 to 10 points in the pulp, the chemicals cost per ton per point increase in brightness is in the range of 64 to 67 cents per ton (air-dry).

The cost of chemicals per ton of paper, for bleaching the groundwood content of a paper produced from 50% bleached groundwood, 40% sulphite pulp and 10% clay, ranges from about $2.00 per ton for a 9 point increase in brightness.

The cost of chemicals per ton of paper per point increase in paper brightness for bleaching the groundwood content of the furnish described in the preceding paragraph, ranges from 38 to 60 cents per ton with brightness increases to 5 to 9 points. Obviously, these cost estimates will vary with the composition of the paper machine furnish.

The cost of an installation for bleaching groundwood at a rate of 50 tons per day is estimated at $90,000 to $100,000.

Subsequent savings in fiber cost are realized by using bleached groundwood for producing papers in which brightness, bulk, opacity, absorbency, and printing properties are important and in which high strength and a long useful life are not so essential. The prinicipal savings are based on: (a) lower cost of fiber, and (b) same opacity obtained in a lighter weight sheet. Savings of 10 to 20% in fiber costs are obtainable in the production of many kinds of papers; in some types of furnishes the savings are as high as 40% of the total fiber cost.

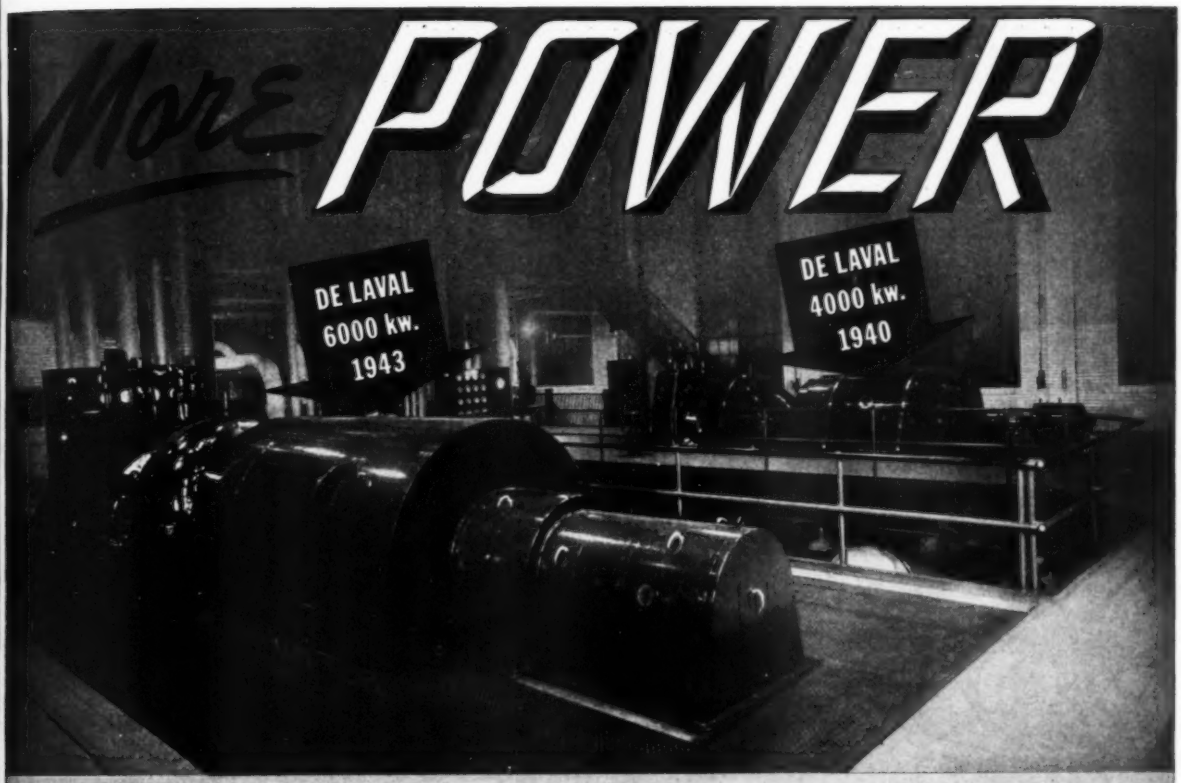
With equipment properly designed for handling sodium peroxide, this operation can be carried out with safety. However, sodium peroxide is an active oxidizing agent and *in the dry state* must not be allowed to come in contact with oxidizable materials such as organic matter in the form of pulp, sawdust, starch, cloth, etc. Sodium peroxide should be stored in the original containers in a dry, fireproof location, away from flammable and combustible materials. In case the container of sodium peroxide is not all used at the time, the partially emptied container should be kept tightly covered; when emptying a container the sodium peroxide should be removed completely. Sodium peroxide accidentally spilled should be covered with liberal quantities of soda ash; the mixture of sodium peroxide and soda ash should be shoveled into a pail, dissolved in water and poured down the sewer. Goggles and rubber gloves should be worn by operators when sodium peroxide, sodium silicate, sulphuric acid, or solutions of these compounds are handled. If these chemicals come in contact with the skin, they should be washed off immediately with large quantities of water, e. g., in a safety shower.

Bleachability appears to vary somewhat with the different species of woods. Spruce, balsam, and poplar are giving satisfactory results in commercial bleaching operations. A study of the bleachability of other species of wood is in progress.

Wood of the same species but grown in different localities has shown small differences in bleaching results.

Bleaching studies on pulps prepared from freshly cut wood and from the same type of wood after aging are not conclusive. Other important variables may have entered into these experiments to obscure the results.

More POWER



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No marked differences in bleaching results have been observed with pulps ground to different degrees of fineness. It is possible that finely ground pulp will bleach in a shorter time than coarsely ground pulp but this conclusion is not definite.

In general, somewhat greater brightness increases are obtained when the pulp is bleached immediately after grinding. However, good bleaching results have been obtained with pulps stored for six months and longer. Molding and spoilage of pulp during storage is accompanied by less favorable bleaching results.

In the consistency range of 3.0 to 7.0% the brightness obtained in bleaching with the same amount of sodium peroxide are higher at the higher consistency. In preliminary laboratory studies, a small additional increase in brightness was obtained at consistencies up to 15%. Further consideration is being given to the effect of high consistencies on the brightness obtained in bleaching.

Table I.—Hours of Exposure for Judging Fastness by Comparison with the Standard Dyeings

	Standard Sun Test (Hours)	Fade-Ometer Test (Hours)
Standard L-1.....	1.5-3	0-0
L-2.....	3-6	0-0
L-3.....	6-12	5-10
L-4.....	12-24	10-20
L-5.....	24-48	20-40
L-6.....	48-96	40-80
L-7.....	96-192	80-160
L-8.....	192-384	160-320

The bleaching time decreases with increases in consistency; at a bleaching temperature of 90 Fahr., the following trend is indicated with 2% sodium peroxide: 8 to 9 hours at 3.5% consistency, 5 to 6 hours at 5.0% consistency and about 2 hours at 15% consistency.

The economic factors in connection with bleaching at different consistencies may be summarized briefly as follows: Bleaching at higher consistencies requires more dewatering equipment and involves higher costs for dewatering. Mixing the bleaching solution with the pulp becomes more difficult, though possible with available equipment at consistencies above 5%. The factors favoring higher consistencies are a smaller bleaching tower or retention tanks, because of the higher bulk density of the pulp and the shorter bleaching period, and use of little or no steam to maintain higher temperatures.

Water of good quality is an important factor in the production and bleaching of mechanical pulps and also in the conversion of the pulps into paper.

Proper proportioning of the chemicals in the preparation of the bleaching solution, as well as proper proportioning of the bleaching solution with the pulp in the bleaching treatment, have an important bearing on the bleaching results. (Reichert, J. S., Campbell, D. J., and Secord, R. A., *Paper Trade J.* 119, no. 16, October 19, 1944).

Temperature has a marked effect on the rate of bleaching and on the brightness obtained in commercial operations at temperatures of 70 to 120 Fahr. In this temperature range, the bleaching time decreases with a rise in temperature. Preliminary laboratory results show a trend in the direction of a considerable increase in rate of bleaching at temperatures above 120 Fahr.

Preliminary results obtained in a study of the neutralizing and reducing treatment in the final stage of the bleaching process, indicate that with good mixing the reaction is completed in a very short time, in general, a time of 1 to 2 hours has been found adequate, though there have been instances when a longer time resulted in a somewhat higher brightness. When sufficient sulphite cooking acid is added to the bleached pulp to lower the pH to the desired value, there is generally enough cooking acid present to complete the required reducing action.

The Establishment of Standard Testing Methods for Light Fastness in the Paper Industry

H. A. LIPS, Technical Laboratory Staff, E. I. du Pont de Nemours & Co., Inc.

In the years prior to 1900, all fading tests were made by sunlight exposures. These exposures were generally quite erratic and did not compensate for the in-

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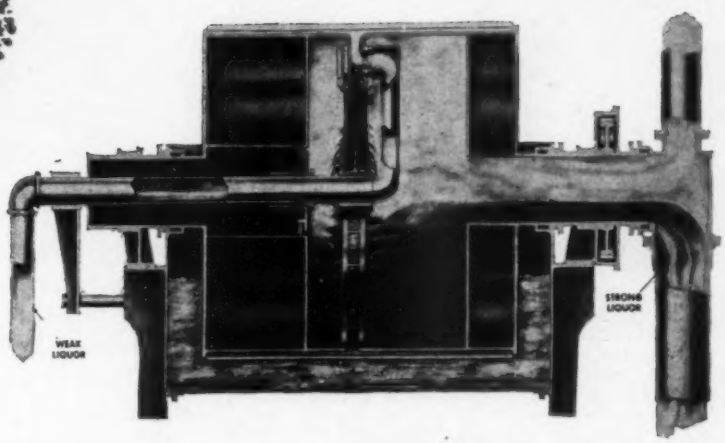

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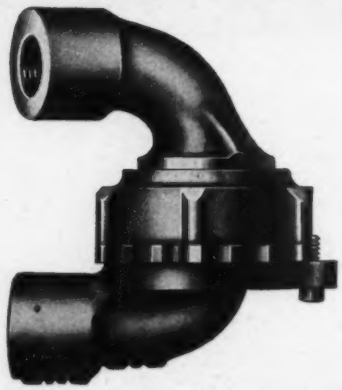

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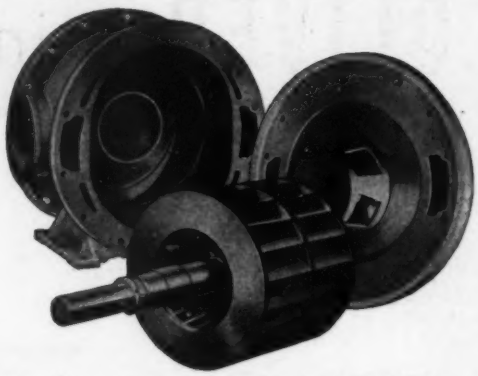

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fluence of clouds, mist, time of day, or time of year. As those variables became better known, numerous attempts were made to standardize sunlight exposures. Attempts were made to measure the energy of the sun's rays and to make exposures for a definite number of energy units. These tests generally failed to take into consideration such factors as changes in humidity, etc.

Lenses were also tried in an endeavor to concentrate the sun's rays and thereby speed up the time required for fading exposures. These tests were unsuccessful because the excessive heat developed during exposure affected the results so that they were not comparable with normal exposures.

In 1927, the National Bureau of Standards in Washington published the results Appel, W. D. *Am. Dyestuff Reptr.* 16, No. 19: 715-719, Nov. 14, 1927) of a series of sunlight exposures made at the Bureau. While these exposures were being made the energy of the sun was carefully measured by using a barium high-vacuum photoelectric cell. The results indicated that the quantity of energy did not necessarily correspond with the degree of fading.

The National Bureau of Standards in 1929 reported the results (Cady, W. H., and Appel, W. D., *Am. Dyestuff Reptr.* 18, No. 11:407-446, June 24, 1929) of an elaborate series of exposures made during the years 1926 and 1927 at the Bureau. Over 1200 dyeings were exposed simultaneously, the purpose being to compare the fadings with and without a cover-glass, the fading in north night, and the fading in sunlight resulting from continuous, intermittent and identical exposures in 2 consecutive years. These dyeings were also compared with Fade-Ometer exposures.

There is still a demand for a standard method for making sunlight exposures. The 1943 A.A.T.C.C. Yearbook (1943 Year Book of the American Association of Textile Chemists and Colorists, 20; 212-215) describes a standard method for making high tests. The samples are mounted in an exposure cabinet which is covered with a good grade of window-glass approximately 0.125 inch thick. The cabinet is open at the sides to allow free circulation of air. The specimens should be not less than 0.5 inch from the glass, which should be kept clean. The cabinet is placed in a location free from shadows and inclined at an angle of 45 degrees facing due south. Exposures are made between the hours of 9 AM. and 3 PM. (standard time) on sunny days between April 1st and October 1st.

The natural disadvantages of relying on sunlight for fading tests created a demand for some artificial fading device that could be substituted for the summer sun. In the years following 1900 a great many artificial fading lamps were introduced.

In 1904, De Bruyn used a 750-watt tungsten filament lamp as a means for light fastness control. This lamp was equipped with a series of colored filters to correct the spectral distribution of the emitted rays ,and a lens for concentrating the beam of light. A water-cooling system was employed to reduce the temperature. The lamp was claimed to have 50 times the intensity of sunlight.

Quartz mercury lamps were tested by a number of investigators as artificial fading lamps. In 1912, a British scientist showed that fadings in this lamp did not correspond with daylight exposures. The light rays emitted by this lamp were found to contain too high a percentage of ultraviolet.

Mott, in 1915, used a white flame arc light. Ten to fifteen hours of exposure were claimed to be equivalent to fifty hours of direct sunlight. This lamp generated considerable heat and the results were not reliable.

Carbon arc lamps were tested as fading lamps and about 1920 were introduced under the name of Fade-Ometer. In England, a similar lamp was introduced as the Fugitometer. This lamp was designed to closely approximate the radiation from the sun during the noon hour of a clear day late in June. The intensity of the light was only slightly stronger that that of the summer sun. This was a considerable improvement over previous fading lamps.

Fade-Ometers have been improved considerably since this time and are today often considered the standard lamps for making fading exposures. The A.A.T.C.C. Artificial Light Fastness Test (1943 Year Book of the American Association

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of Textile Chemists and Colorists, 20: 212-215) reads as follows: "The apparatus for this test shall be a type FDA Fade-Ometer or its equivalent, operated under the conditions recommended by its manfacturer."

It is well known that even the best fading lamps operating under identical conditions, will not always give identical fading results. Two lamps operating on the same voltage line may differ considerably. Even with the known differences in the rate of fading between lamps, we still speak of light fastness in terms of Fade-Ometer hours.

Another problem is how to describe the degree of fading or how to rate light fastness so that various mills making light fastness exposures can compare fadings in terms of a common language. In order to accomplish this, a considerable amount of work has been done toward the establishment of color standards for light fastness comparisons.

The A.A.T.C.C. (1943 Year Book of the American Association of Textile Chemists and Colorists, 20: 212-215) at present uses a set of eight dyed woolen pieces as standards for classifying light fastness. These standards are coded L-1 through L-8. Standards L-1, L-2, and L-3 are recommended for sunlight exposures. Standards L-3 through L-8 are for use in classifying exposures made in an artificial fading lamp.

Light fastness is classified in terms of the change in the color standard. For instance, L-4 corresponds to the light fastness of textiles that show no greater change in color than Standard L-4. When these standards are used consistently, a considerable part of the useful space of the Fade-Ometer is in use in exposing the standards.

This fact indicates the desirability of measuring the quantity of fading energy generated by the lamp in a definite time period. The purpose of this test would be to establish a means to compensate for the known or indicated differences between fading lamps, so that exposures made in one lamp could be interpreted to correspond with exposures made in any other lamp.

It is the opinion of the fastness committes of the A.A.T.C.C. and the A.S.T.M. that in addition to the present wool standards, a method is needed for standardizing fading lamps. In recent years, we have become more or less accustomed to speaking of light fastness in terms of Fade-Ometer hours. Naturally, it is important to have as a guide a standard hour rather than a measure that in itself is a variable. These fastness committees have been attempting to find some simple test that would give the results desired and at the same time not represent an appreciable capital investment. The Optical Properties Committee of the TAPPI has been considering this same problem and has deemed it worthwhile to have one of its members review this work for the association.

The present thought is that a control, which might be a piece of dyed paper or a textile colored with a dye or dyes selected to exhibit the required sensitivity, be exposed in the lamp daily for 20 hours or for the length of time a trim of carbons serves. After 20 hours exposure, the control is to be removed and compared with a set of standards. These standard will consist of permanently colored plastic chips which will illustrate 12, 14, 16, 18, 20, 22, 24, and 26 hours of exposure in the standard lamp.

As an illustration for commercial use, the control and the sample to be tested will be exposed simultaneously. After 20 hours, the control will be removed and compared with the standard plastic chips. If the control shows no difference in shade from the Standard after 20 hours of exposure, it would indicate that the lamp under consideration performed in the same manner as the standard lamp for this 20 hours of exposure. Therefore, all samples in this lamp would be credited with 20 hours of exposure.

If, however, after an exposure of 20 hours in the lamp under consideration, the control appeared like the plastic chip representing 14 hours exposure all the test samples exposed at this time would then be credited with having only 14 hours of exposure.

The committees now intend to select as a standard lamp one that would represent the average degree of color change exhibited by the control after 20 hours of exposure in fifty or more lamps. In this way it would be possible to set up a simple, practical means for comparing all

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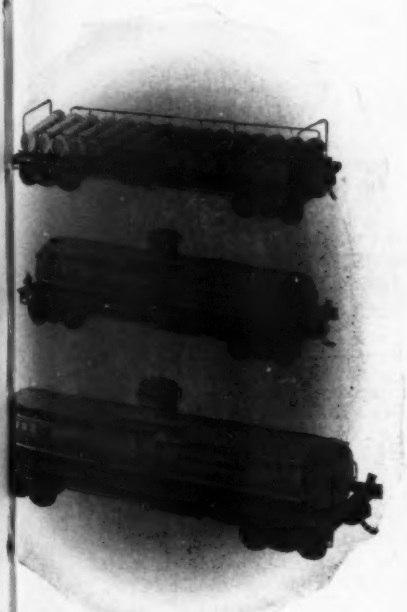

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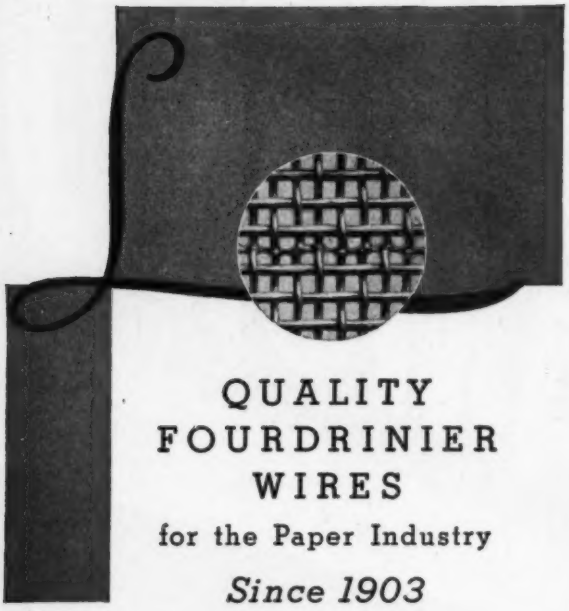

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fading lamps on a more rational basis. The dyed control would be made available to any person interested and the plastic chips would be obtainable at reasonable cost.

This proposed method could also be used for rating sunlight exposures. It would afford a practical means for relating these exposure to those made in a fading lamp in terms of standard hours.

It is hoped that this report will serve as a background for developing a standard light fastness test for the paper industry so that all light fastness exposures may be reported in terms of standard hours.

The following abridgment is of a paper presented on March 15, 1945, before a meeting of the Michigan Division of The American Pulp and Paper Mill Superintendents Association, Kalamazoo, Michigan

Planning the Postwar Paper Machine

H. C. MOORE, Vice President
Beloit Iron Works

Obsolesence is not based on *Upkeep* of equipment but on *Improvement*. An outstanding example of this is the rebuilding by Allied a number of years ago of the Monarch mill. The power plant changes, stock system improvement and paper machine rebuilds which they undertook have resulted in an over-all production increase of over 30 per cent with additional improvements in quality and decrease in maintenance costs. This was not in any way haphazard. It was a carefully planned program and the economy of the move is self evident.

The last paper machine we shipped was built for K.V.P., the 136-in. combination Yankee machine.

Since that time, we have completely dedicated our facilities to winning the war. Our experience in building special machines in the past for your use made it possible for us to shift quickly to many special type machines for Uncle Sam. Each type, at the time we built it, represented the program most vital at that time. Now we have capitalized on the war to the extent that the experience gained in the past has been of great value in preparing for the coming postwar demand for higher speed machines designed to meet paper specification demands which will again become important and increasingly exacting. We not only have new ideas but our entire organization has undergone a broadening which accrues from a sustained period of constantly tackling new problems and learning new techniques.

A few years before the war a trend started in the paper industry which is characterized by the K.V.P. waxing machine, the Rhinelander glassine and greaseproof machine and the International fourdrinier board machine. This is a trend toward specialization. This has two advantages—higher production and better quality control. The war has accentuated this trend by the cutting down of grades.

We have several Beloit flow eveners used in conjunction with the double adjustable slice in operation on kraft paper and a number of others will soon be installed on book, groundwood and tissue grades. This combination is designed to give uniform flow of stock to the wire and results have been good. Many of you are familiar with the Beloit double adjustable slice and have these in operation on your machines.

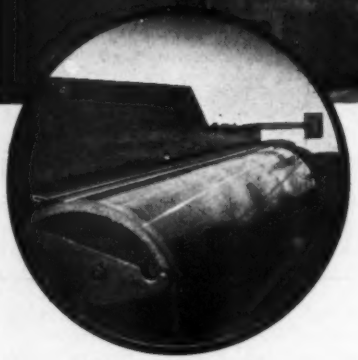
At the present time we have only one suction primary couch in actual operation. It is on a fourdrinier board machine having a long wire and built for 600 tons per day. It has given a good account of itself in providing a drier sheet to the presses, longer wire life and by helping to drive the wire. An ingenious drive arrangement has been worked out which varies the power input to the roll with the vacuum in the roll so that it will not slip in the wire before the sheet comes across.

We are not prepared at this time to say that this installation will be justifiable for all grades but we see definite possibilities in it for many.

On certain higher grade sheets where a reverse press is desirable, we have designed a combination horizontal suction

Standard Type K

LODDING DOCTORS



Old doctor back with new LODDING blade holder

Type M heavy duty for rubber covered rolls on high speed machines. Takes composition blades 1/4" x 3". Can be moved out for additional wear

Type M showing blade moved out with new beveled edge for additional wear

THIS PRESS ROLL is equipped with LODDING DOCTOR and Standard Type K general purpose adapter.

LODDING FLOATING BLADE DOCTORS—light, sturdy, non-vibrating, non-sagging—give you the added protection of the LODDING patented streamline brass blade holder, eliminating buckling because the blade is permitted to expand under all operating conditions. The LODDING holder takes blade .015 to 1/8" thick—low operating angle, better fit, longer wear, no chattering. One full inch of blade wear. Complete change in less than one minute.

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Correct, continuous doctoring avoids much maintenance and operating trouble.

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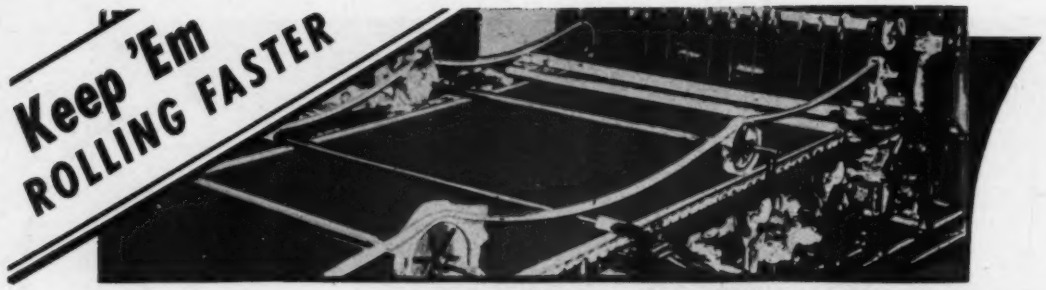

with Magnus Slime Remover

No paper mill today can afford to waste time on manual clean-ups to remove slime deposits. Nor can any chances be taken of shut-downs and excessive rejects of paper caused by neglected slime growth. After all, slime grows while the machines are running, as well as when the system is shut down.

Magnus Slime Remover, consistently used, will keep slime troubles at a low level, and require a minimum use of labor in controlling slime. It not only loosens and disperses deposits so that they can be flushed clear of the system, but also tends to inhibit slime growth by killing the bacteria and micro-organisms that cause it.

There is a whole series of Magnus Cleaners and Compounds to help you keep 'em rolling faster, including Magnus Beatex for putting water into the stuff faster, and Magnus Felt Conditioners for adding extra service life to felts. Ask us for complete details.

MAGNUS CHEMICAL CO. 192 SOUTH AVENUE, GARWOOD, N. J.

Magnus Paper Mill Cleaners

first press having a double suction box and rider roll on top of the suction roll and a horizontal second press. This has been worked out to give shortest possible draws and is a very practical installation.

Still another type is the patented Rhinelander type of close center press. This is so arranged that the top rolls are hung from overhead beams. It takes up much less room than the conventional and results in very short draws. Felt rolls carried on the bottom roll framing so that the time involved in changing felts is minimized.

Another feature which we have worked out for use with any press design is a diaphragm type pneumatic loading. This combines a good accurate loading with sufficient cushion to avoid injury to the felt. It is applicable to the dual press, close center press or the conventional.

Among the features which will make dryers smoother at high speeds and solve maintenance problems are enclosed dryer gears, roller bearings on dryers with special mountings, and continuous lubrication.

The sheet characteristics dominate the type of reel selected. On book, bond, and other sheets where it is desirable to maintain very uniform tension on the spool or to wind up a soft roll, the Beloit center wind reel is very good. It combines the advantages of a good start from the drum and a soft roll wound in centerwind position. The postwar center wind reel has been streamlined and the controls have been made more accessible to the operators.

The board reel which utilizes pneumatic cylinders that hold the roll against the drum both on the primary and secondary arms has made a very good account of itself both on cylinder and fourdrinier board. Over a score of these reels are in operation today. In cases where this type of reel has replaced a 2-spool reel, the savings of saleable board have been marked.

We have been busy in recent months improving and streamlining our double drum winder. The frame has been redesigned and the slitters made more accessible. Such features as the roll kicker, counter-balanced rider roll, constant tension device and disc type unwinding stand brake have been retained.

For smooth machine operation in the past we recommended hypoid or spiral gear units totally enclosed with a roller bearing mounted heavy duty lineshaft. Used in conjunction with this on such sections as cylinder wet ends, dual press third roll, Yankee wet end, coating sections, etc., we have incorporated electric helper drives. We have now just completed installation of a hypoid drive utilizing Texropes between the lineshaft and individual units.

A new Beloit air clutch has been installed in the dryer sections of several high speed kraft machines and we are pleased with its performance. Many postwar Beloit drives will be equipped with this type of clutch. Also molded type clutch plates have been successfully used.

We would no doubt be the exception if we couldn't lay claim to having a new vat design. Incorporating the double entry pipes used on fourdrinier flow evener and a cross current arrangement which we have patented, this counterflow vat is still conventional enough that we do not hesitate to recommend it to the most conservative mill. Its design lends itself beautifully to stainless steel construction. This vat is designed to give uniform distribution of stock across the face of the cylinder mold.

We have heard much recently about new materials. We are constantly on the look-out for those materials which are best for the job to be performed. We see many uses for stainless steel. We will continue to use aluminum in increasing quantity where lightness is called for. We believe that rubber will be used very much more at the wet end than ever before. We see interesting possibilities in the use of liquid Neoprene and are using it now for such items as rectifier rolls, doctor backs, etc. We have used Micarta in the past for covering table rolls, shake springe, doctor blades and suction roll packing. Plastics will be used in the postwar machine where their characteristics will be of advantage. In the past two years, our improved foundry technique has made 50,000 lb. tensile iron readily available for paper machine use, and combining this with our recent experience in normalizing opens up new fields for cast iron.

I think I am safe in saying there are no new design features for paper machinery which would make it pay for anyone to sit back and wait to see when it comes rather than keeping present equipment up to date. As we travel around the country we see so many old

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, 1945

THE DEGASIFICATION OF WATER

SINCE 1885 Cochrane engineers primarily have designed and applied equipment for the heating, degasification, and chemical treatment of boiler feed water. Naturally, in more than fifty years of such activity, problems were encountered requiring equipment to condition and degasify waters of unusual physical and chemical characteristics. For example, feed water deaerating equipment to operate at pressures ranging from sub atmospheric to over 125 lbs. per sq. in. has been designed and installed. Equipment for deaerating cold water at temperatures as low as 35 deg. F., and other equipment for removing carbon dioxide, hydrogen sulphide and ammonia have been furnished in large as well as in relatively small capacities.

The problem of removing dissolved gases from water may be quite complex, as coordinating a design and determining a guaranteed performance involves a thorough analysis of temperatures, gas pressures, viscosities, ionization, division of water and vent rates. An apparatus designed to remove oxygen to "zero content" is quite inadequate for removing a small quantity of ammonia. Likewise, a decarbonator designed to remove large quantities of carbon dioxide may not be suited to remove hydrogen sulphide.

Knowledge of these factors and their relative importance in the design of degasification apparatus is a part of Cochrane experience and is supported by tests and data from actual installations, placing us in a position to quote on equipments for degasifying water irrespective of their size.

Outstanding Cochrane equipments vary in size from 1000 lbs./hr. to 45,000,000 lbs./hr., indicating the broad coverage of Cochrane experience.

The purpose of this bulletin is to point out briefly some of the problems of degasification and to indicate generally the equipment used in the solution of these problems.

[1]

A NEW PUBLICATION YOU WILL WANT TO EXAMINE

The booklet shown on the right, from which the above page is taken, describes concisely many pieces of equipment designed and manufactured by Cochrane for the removal of Ammonia, Carbon Dioxide, Hydrogen Sulphide, Oxygen and other gases from Process and Boiler Feed Water. Write for a copy mentioning any specific water problem in which you may be interested.

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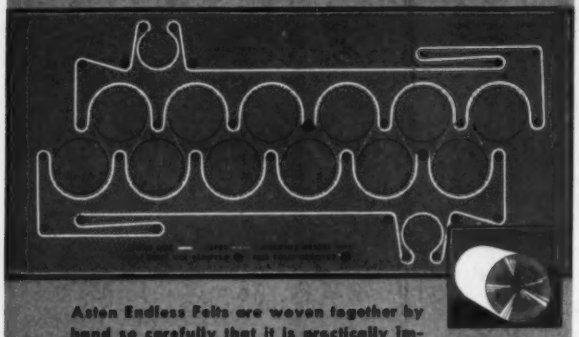
FOR ANY STANDARD PAPER MACHINE



Asten Endless Felts are woven together by hand so carefully that it is practically impossible to detect where the ends are joined, and so securely, that it is impossible for them to pull apart in service. Installation is made by pulling one looped end over the dryers, removing the felt rolls that are inside the felt, and replacing them again, one by one, as the felt is pulled in place. Illustration at the right shows how they are rolled for shipment, with a core in each looped end of the felt. . . . Asten Felts can be joined with any type of seam you are accustomed to using. . . . We have recently published a 28 page book illustrating and describing various types of dryer felt seams.

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core gear drives and clutches, old style suction rolls low in vacuum and high in maintenance, old Fourdriniers high in iron content and low in shake efficiency. In short, there are so many mills that could lower maintenance cost, shorten shutdowns and make money by instigating programs of replacing drives and suction rolls, putting roller bearings in table, wire and felt rolls, installing Sheahan carriers, judicious use of additional suction rolls, lengthening wires, adding dryers, etc. In older units where a size press would make you more flexible, the short center press arrangements offer interesting possibilities together with the use of Feeney type felt dryers which are very effective. On cylinder machines, although we have new suction roll arrangement ideas, we still feel that the suction drum press is the first thing we would recommend and we are enthusiastic over performance records of the suction primary and second presses.

We haven't yet figured out how to displace the removable Fourdrinier. It saves valuable time in changing the wire and it assures you of proper alignment of table, wire and breast rolls and suction boxes. Our new methods of stainless steel clad beams and cross ties is a nice job. I think the recent increase in labor costs have definitely widened out the range of uses of the removable fourdrinier to the small, slower speed machines which in the past have not as easily justified its use.

We know there are a good many more machines in this country that were built before 1930 than since then. In view of this, we are of the opinion that if this country is to attain a yearly tonnage in the neighborhood of 20,000,000, we can solve a large part of this increased tonnage problem by looking to existing equipment and by working on bottlenecks whether they are drive, formation, short wire, insufficient dryers, etc., cutting down time to a minimum and getting the most out of what we have.

The two following abridgments are of papers presented at the 1944 Annual Meeting of the Technical Association of the Pulp and Paper Industry, held in New York City

Abrasion Resistance of Paper Base Plastics and Associated Materials

EDWARD R. HOFFMAN, Asst. Physicist
Hammermill Paper Company

Some of the difficulties in making an abrasion test are the indefinite conditions surrounding an abrasive action, the difficulty in maintaining a constant wear, and the relation between a test and field applications. The commercial abraser manufactured by the Taber Instrument Company has gone a long way toward standardizing an abrasion test.

The abraser is a small compact machine consisting of two essential parts; the base and the abrading heads. The base is approximately 12 inches long and 5 inches wide and has on top a 4 inch-diameter turn-table to hold the specimen. The table is electrically driven in a counter-clockwise direction and is cooled by a fan within the base. It revolves at a rate of 70 rpm and the revolutions recorded by a counter device. Supported from the base are dual, lever type, abrading heads each consisting of a free turning abrading wheel and a means for applying loads from 125 to 1,000 grams. In operation the abrading wheels are lowered onto the specimen attached to the table. The wheels are 2½ inches apart, are equally distant radially from the center of the turn-table, and have a common line of rotation about ¾ inch from the center. As the table rotates during a test the surface of the specimen passes diagonally under the face of the wheels causing a rubbing action as the abrading wheels are forced to rotate. The resulting wear track is a circular path covering approximately 10 square centimeters of surface.

The machine is equipped with five grades of abrading wheels, 2 inches in diameter, designed to give a range of abrading speeds suitable for use upon a great variety of materials. The wheels are made of rubber-like compositions containing various grades of abrasive materials which wear away with use bringing new and sharp abrasive material to the surface. The wear-action is the combined effect of the sharp abrasive materials cutting minute scratches in the

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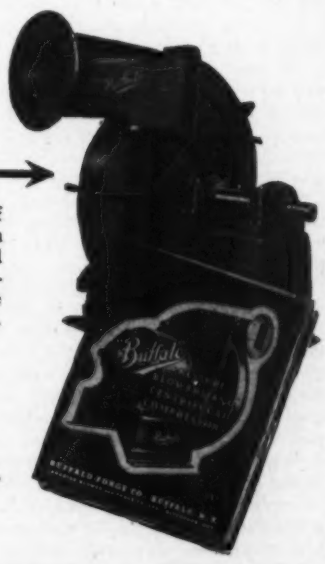
The NEW Type "B" Axial Flow Fan ← fully described in Bulletin 3533

—was designed to fill the need for a duct-mounted fan for the light duty common to ventilating and air conditioning service, that is for static pressures from ¼" to 1½". Made in nine sizes, up to 48" diameter, in belted-drive and direct-drive models, with or without vanes, the new Type "B" line offers quiet, efficient, reliable performance at moderate cost.

NEW Pressure Blowers and Centrifugal Compressors described in Bulletin 3553 →



—These new heavy duty blowers have a wide range of application—handling air for oil or gas furnaces, on high pressure installation in glass, steel and chemical plants, for scale and water blow-off problems, experimental work, etc. They are suitable for pressures up to 4# per square inch. Newly developed rotors give efficient, trouble-free operation. Alloy construction of all or part of each blower is practical.

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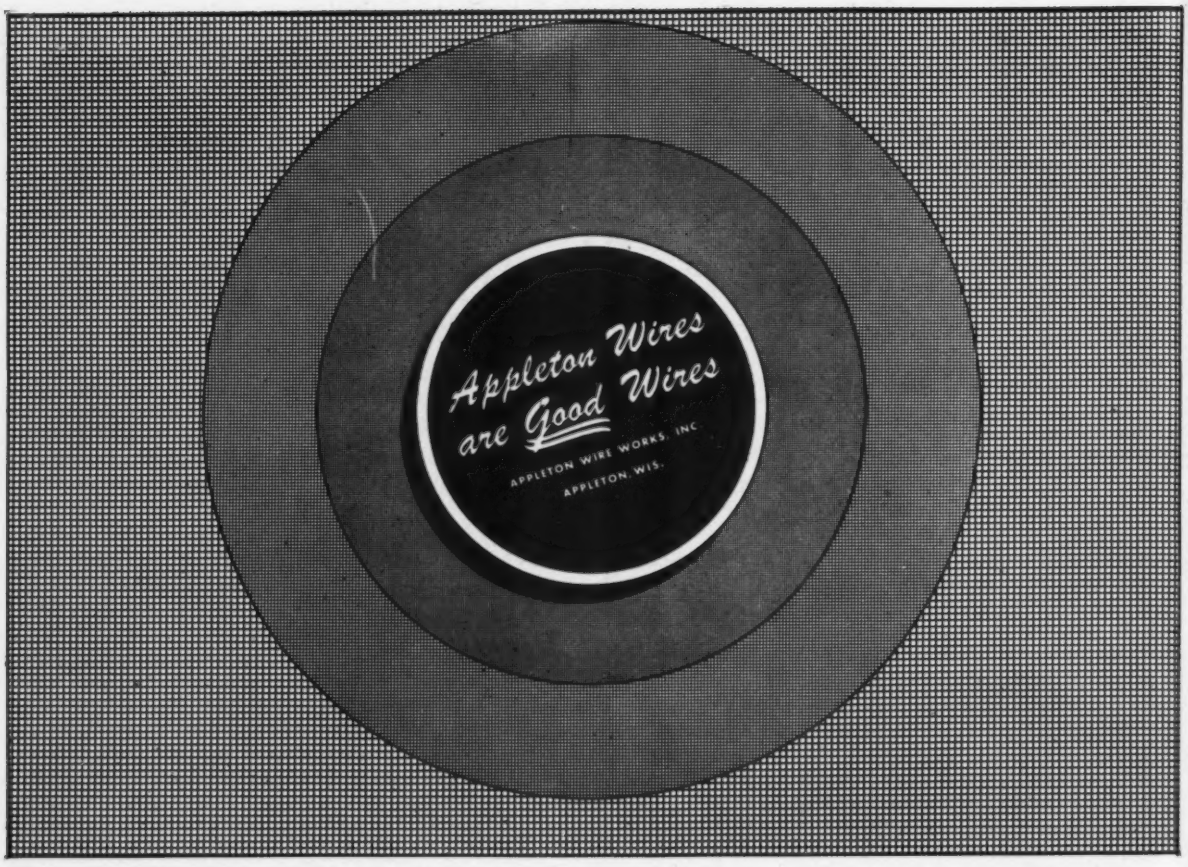

surface of the specimen while the rubber-like portion rubs the surface like an eraser and the abraded material is discharged from the wear-track by the motion of the abrading wheel.

On most surfaces, the abrading wheels pick up a portion of the abraded material causing the efficiency of the wheel to decrease. For standardizing the wheel surface, disks of emery paper are furnished which are placed on the table and run similar to a specimen. The emery paper readily removes the outer surface of the wheel exposing new material. The operation is called resurfacing.

The abrasion resistance of a material is defined as the loss in weight resulting from a specified number of revolutions of the material when using a given abrading wheel under a given load. The selection of the appropriate wheel and weight is important. If the wheel is too coarse or the load too large, the specimen may be "worn-through" and destroyed in too short a time; on the other hand, if the wheel is too fine, an excessively long time is required to produce sufficient wear. For the work on paper base plastics and associated materials, the wheels designated as CS17, operating under a load of 1,000 grams per wheel, have proved satisfactory, and all data and results given below were made under these conditions.

Wear-rate data were obtained by initially weighing the specimen, running the specimen on the abrading machine for a specified number of revolutions, reweighing, and repeating the sequence several times. The abrading wheels were resurfaced with 20 revolutions between *each* weighing. For thermosetting laminates and the more abrasion resisting materials, reweighings were made every 1,000 revolutions for a total of 5,000 revolutions; for softer materials, as the thermoplastics, weighings were made every 100 revolutions for a total of 500 revolutions.

The present investigation has covered a wide variety of materials, plastic as well as nonplastic, with emphasis on plastic coated and laminated papers.

It was found that the abrasion resistance of paper base phenolic laminates was affected by the moisture content of the laminate. The abrasion rate for a given specimen appears to be approximately constant for relative humidities up to about 75% and then the abrasion rate increases rapidly.

On the other hand, the abrasion rate for laminates conditioned at 52% R. H. but made from paper conditioned at various humidities prior to laminating was unaffected by the moisture content of the impregnated paper. This seems surprising considering that large variations were found in the mechanical properties of laminates made under similar conditions.

The abrasion of panels made with various numbers of sheets was investigated to determine if a few sheets formed as a panel represented a true test specimen, and because of the interest shown in finishing inexpensive boards with a few sheets of resin-impregnated paper. The wear-rate increases as the number of sheets per panel increases up to about fourteen sheets after which there is little change in the abrasion quality. This represents about a 75% decrease in abrasion resistance. The explanation of this phenomenon is still unknown and due to the magnitude of the variation further investigation is warranted.

This increase in wear-rate with sheet thickness was also observed when a few sheets of impregnated paper were laminated to pressed boards.

A number of paper base laminates were made with high strength unbleached sulphite paper and various commercial low pressure phenol formaldehyde resins.

Preliminary investigations had shown that with a given paper and resin, neither variations in resin content from 35% to 48% nor variations in laminating pressure from 50 to 3,000 psi. had any significant effect on the wear-rates.

However, the wear-rates did vary over a rather wide range with the various phenolic resins, and showed a somewhat wider variation in abrasion resistance than in other physical properties.

Phenolic laminates made with different paper bases showed that certain fibers possessed better resistance to abrasion than others.

A number of unbleached sulphite papers were impregnated and laminated under

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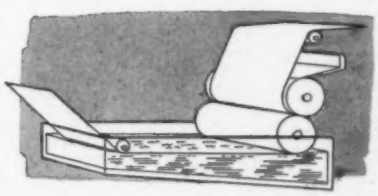

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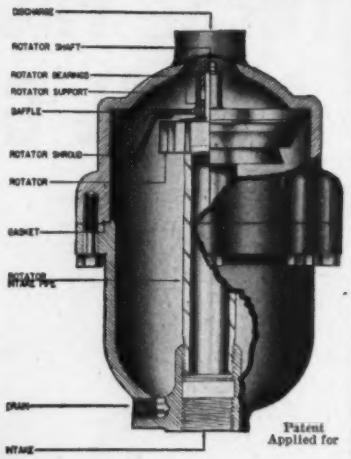

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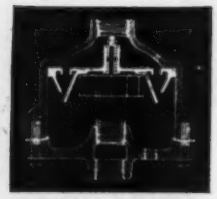

Drawing shows turbo-rotor, shroud and baffles. The design of the baffles precludes the possibility of capillary action of entrainments resulting from high velocity.

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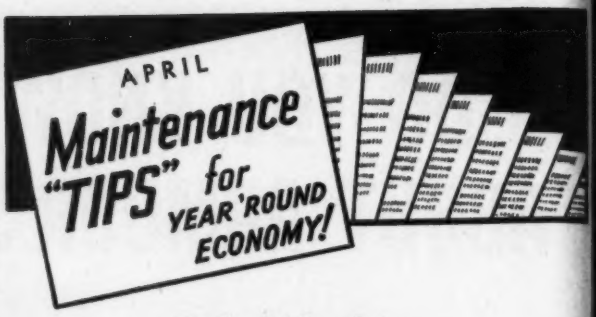

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like conditions with a representative low-pressure phenolic resin. The wear-rates varied from 20.4 to 31.4, with an average of 27.6 mg. loss per 1,000 revolutions. Bleached sulphite laminates made under identical conditions had wear-rates from 11.7 to 21, with an average of 16.2 mg. loss per 1,000 revolutions.

The wear-rates on laminates made from rag paper varied from about 10.4 to 21, with an average of 14.5 mg. loss per 1,000 revolutions. There was no difference between bleached and dyed rag papers.

Laminates made from unbleached sulphite papers varying in thickness from 2.3 to 6.0 mils showed no variation in the wear-rates.

The orientation of the fibers in a paper base laminate plays an important part in the abrasion resistance. In all of the above specimens the lay of the fibers was parallel to the surface tested. A specimen was made in which the fibers were perpendicular to the surface and the wear-rate for this laminate was of the order of 3.5 mg. loss per 1,000 revolutions, comparable to sheet iron.

Blowpit Consistency Control

J. N. SWARR and ROBERT D. COWHERD
Engineers, The Bristol Co.

The blowpit unit process is a continuous one due to the maintenance of a material balance between solid and liquid content by the control of the liquid addition under conditions of continuous flow from the process to the brown stock washers.

To apply an automatic control to such a process, an independent control variable or variables must be chosen that will be indicative of the chemical or physical condition of the material in the process. The problem resolves itself into controlling the solid content of the pulp supply to the washers. The impossibility of individually making determinations of actual consistency and subsequently adjusting a valve is apparent. It is, therefore, necessary to select a dependent variable; one whose measurement reflects the actual value of consistency itself, and does so in a direct and constant relationship.

Fortunately, the construction of a blowpit incorporates a set of motor driven agitator blades; consistency can, therefore, be reduced to a measure value through a series of dependent variables. These are: viscosity, hence shearing force on the agitator blades and hence power input, either reflected electrically in the motor or by some physical means.

To establish a control function, it is important that the so-called process lags be understood and determined. These are generally three in number: capacity, transfer, and velocity-distance lags.

The capacity lag is usually divided into two components: demand side and supply side capacity lags.

The demand capacity is the ability of a process to withstand a change in potential energy following the change of another variable effecting the process. It is the potential energy storage or fly wheel effect of the process that tends to resist external disturbances. A high demand capacity will tend to stabilize the potential of the system and as such is advantageous to most control functions.

On first analysis, one might think this factor was well established in a blowpit because of its large physical dimensions. When it is realized, however, that the dilution section of the equipment is in the lower conical portion between the liquor input bustle and the discharge line to the stock pump, the capacity lag is not too large considering the flow from the section to the washers.

Supply capacity lag and the resistance of a potential transfer barrier to the process may be grouped to form transfer lag. It may be considered as the resistance to flow of control potential between the supply and demand capacities. The supply capacity and resistance to potential transfer should be small for good control. In the present problem, the valve should be close to the blowpit and not in a position where, even though the valve is shut, the pipe capacity downstream from this point is still delivering dilution liquor.

The velocity-distance lag, sometimes called a transportation lag, is the time required for a change to be reflected in the measuring device after the controlled potential is applied. This can be minimized by adequate agitation surface.

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HP	Make	Type	Volts	Speed
500	G.E.	TS	2200	450
500	G.E.	TS	2200/440	720
600	G.E.	TS	2200	600
270	G.E.	ATI	440	600

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300 HP G.E. type ATB, 900 RPM, suitable for power factor correction.

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We can furnish Motor-Generator Sets, with proper direct current motors, making up Variable Voltage Drives. Our past thirty-five years of experience gained in working with paper mills, both large and small, is at your disposal in helping you with any of your electrical and power plant problems.

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The dependent variable of liquor flow is the most important portion of this control problem. This can be explained as follows: There are two factors which work to change the rate of flow of dilution liquor through the control valve with a given setting. The rate of flow through a V port valve is approximately proportional to the square root of the differential pressure across the valve. Therefore, with a given valve setting, the actual flow through the valve will vary with:

(1) Variations in upstream pressure
(2) Variations in downstream pressure

The upstream pressure varies with the level in the black liquor storage tank. This varies rather slowly and does not make the control problem difficult. The downstream pressure, however, is essentially equal to the head of pulp in the blowpit. With a full blowpit, this head will be about 45 feet. The minimum level will be a foot or two above the liquor inlet lines. Assume the stock level to have dropped to within 5 feet of the liquor inlet lines and a digester to have blown, which, in a space of a few minutes, will raise this level to 20 feet above the liquor lines. This will increase the back pressure on the valve by about 300%, which will decrease the differential pressure across the valve by 300%, which will reduce the flow through the valve to about 60%. If two digesters are blown at once or consecutively, the flow through the valves will drop to about 40%.

It is obvious that if the dilution liquor flow is suddenly reduced by 30, 40, or even 5%, that high consistency stock is the result. Either one or all of the following may occur: (1) shear off the agitator blade, (2) kick out the agitator motor, (3) plug the stock lines, (4) plug the stock pump.

From the above, it is plain that there will be a greater variation in consistency because of changes in the rate of flow of the dilution liquor than from any other cause such as variations in stock from the digesters. Therefore, it is more important to control this load than any other factor. In other words, if stock from the digesters at 12%, is to be drawn off at a constant rate, to obtain uniform consistency, the flow of dilution liquor at a constant value must first be controlled regardless of variations in upstream and downstream pressure across the valve.

This is the function of a flow controller. As variations tend to occur in the rate of flow, this flow controller operates a synchro valve to hold the flow constant and as long as the stock from the digesters is constant, it will maintain a constant consistency.

Also incorporated is a type of control which the Bristol Company calls "Autoset" and has been defined as when the measured condition of medium A selects a point of control in medium B with the objective of maintaining a fixed value of medium A. Incorporated in the flowmeter is a bellows pressure element which repositions the control point of the flowmeter in accordance with the air pressure supplied to it from the wattmeter. In the wattmeter, therefore, a change of controlled air pressure from 0 to 15 psi moves the control point of the flowmeter from 0 to full flow, with intermediate positions proportional to pressure. The valve in the dilution liquor line is operated by the resulting controlled air pressure from the flowmeter. The flow controller, therefore, prevents large fluctuations completely and is the essential element of the whole system. The wattmeter control is merely a super-refinement. The flow control removes the large variations and the wattmeter control removes the small ones.

The removal of emphasis from the electrical to the supply side of the process is the new and novel change in the solution of this problem.

The wattmeter air control system employed is of the "Reset" type which is a combination of two types, namely, proportioning and floating. For a more complete discussion of this in both theory and practice, reference is made by Peters and Olive (Measurment and control of process variables, fundamental principles of automatic control, *Chem. Met. Eng.*, May, 1943) and Rhodes (*Industrial Instruments for Measurement and Control*, McGraw-Hill Book Company, Inc., New York, 1941). It may be said, however, that the advantages of such a combination is the lack of departure or droop due to load changes.

The recording controller is of the mercury manometer type, using as its primary measuring element, a stainless steel thin edge orifice plate.

The flowmeter air control system used is of the proportioning type. Incorporated in this flowmeter in addition to the above, is a bellows type pressure element linked to the control spotter. The pressure source for the operation of this element is supplied from the controlled air pressure originating in the wattmeter. The controlled air pressure from the flow controller is piped to the diaphragm on the synchro valve in the dilution liquor line to the blowpit.

The conditions under which a test run was to be made are the following:

Conditions of maximum washing capacity would be imposed.

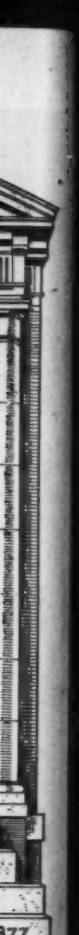
Digester production would be adjusted so that all blows would be received by one tank.

The test period should be confined to the taking of eight samples at 15 minute intervals.

Sampling should be accomplished at a valve between the blowpit and the suction side of the stock pump to the washers. The difficulty of obtaining a representative sample at this point was because of the valve being installed in a line perpendicular to the pulp flow. This may introduce error. The fact remains, that if each sample be withdrawn in a like manner, the relative values obtained will be comparable.

Control point settings on the wattmeter, and hence consistencies, were to be made at 10, 12, and 14 kw.

"Blows" from the digester did not affect the operation of the flow-wattmeter



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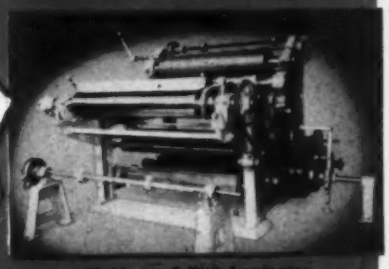
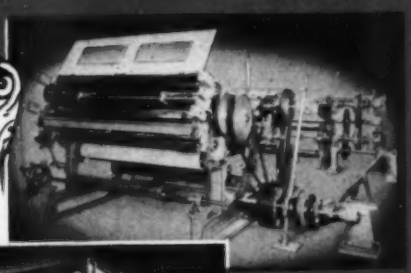
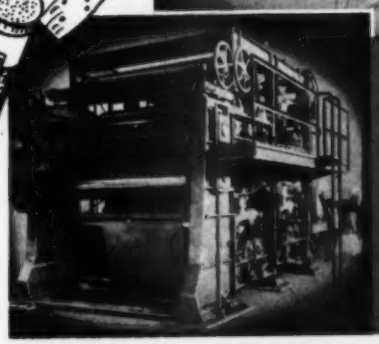


Waldron—2 Web Laminator



Special 2 Web Laminator for applying Cellophane to paper or board.



Five Web Laminator —fast running wide special unit.

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WALDRON LAMINATORS

These are the machines used by practically all the leading converters for producing the basic materials for an almost unlimited number of popular products. Waldron Laminators are built to handle from two to ten or more webs, combining such materials as paper, board, cloth, Cellophane, Pliofilm, metal foil, varnished paper, felt, sisal, burlap, wire, wadding, etc., at speeds up to 700 feet and more per minute. Designed for any type of adhesive; embodying advanced methods of guiding, controlling and drying, Waldron Laminators are providing the essential properties required, speeding up output and lowering production costs.

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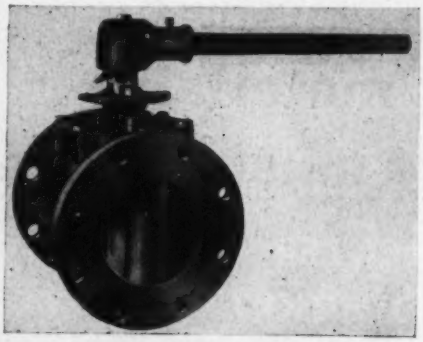

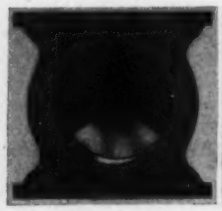

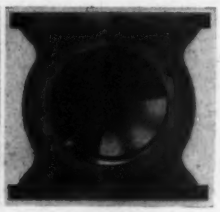

Valve closed.

Valve partly opened. Note clearance between plug and seat.

A SUPERIOR VALVE FOR ALL PAPER AND PULP MILL PROCESS LINES

EASY OPERATING—The exclusive eccentric principle eliminates contact between the plug and seat as soon as the plug is rotated. No possibility of seizing or binding. An 18" valve requires only a 30" lever.

CLEAN—No bonnet cavity in this valve, therefore, no place for dirt to form.

SIMPLE AND EFFICIENT—Fewer parts means low cost. Operates with quarter turn.

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control because its ability to offset this load change to the process.

An adequate supply of dilution liquor must be present if the controller is to have complete domination of the process at all times.

The control valve should be located as close to the dilution bustle as is feasible. This will decrease the transfer lag of the process.

In the design of pumping requirements in the dilution system, separate pumps should be used on the blowpit line and that supplying the washers.

The one factor that will throw a blowpit out of control and overload the agitator blade more than any other, is the indiscriminate operation of the stock feed valve to the washers.

In conclusion, it may be said that the results of these tests are not satisfactory; not from the mechanism of the tests themselves, but from the possibilities of an additional air control feature and several other features that now seem feasible. It is, therefore, a distinct hope that future progress on the control of blowpit consistency can soon be reported.

Treatment of Paper Mill Wastes for Recovery of Fiber Filler, and Water

A. C. EMBSHOFF, Manager
Industrial Div., Infilco, Inc.

Probably the first approach to the recovery of solids from mill waste water was plain settling, or the attempt to settle, in ordinary tanks or basins. Because of the nature of the solids involved, such plain sedimentation is seldom entirely satisfactory. Aside from the naturally slow settling characteristics of the solids with consequent necessity for basis of large size, the entrainment of air or foam, in many instances, results in flotation of a considerable portion of the suspended solids.

Advantage has been taken of this flotation tendency occasioned by entrained or occluded air in equipment now in use in a number of mills. While such "save alls" are, in general, much more effective than settling tanks or basins, it was felt that better results might be obtained by other means, and possibly at a lesser cost.

In testing of such waste waters it was observed that slow stirring, without the addition of a coagulant in some instances, and with coagulant added in others, effected a material improvement in settling characteristics presumably through the promotion of agglomeration of the suspended solids. Apparently such stirring, under properly controlled conditions, afforded an opportunity for the release of entrained air, with consequent reduction in buoyancy, and also aided in enmeshing the particles with each other to form a more easily separated sludge or slurry.

The laboratory results appeared so promising that arrangements were made to operate an "Accelator" pilot plant in a paper plant late in 1941. This equipment was suggested for this application because its design afforded thorough but nondisruptive circulatory agitation, intimate contact of the incoming waste with a circulating slurry of the thickened solids, and clarified water release above the circulating slurry zone. Under these conditions, any self coagulating effect of the waste in question is fully utilized; and, where the use of an added coagulant is indicated, maximum coagulating benefit is obtained.

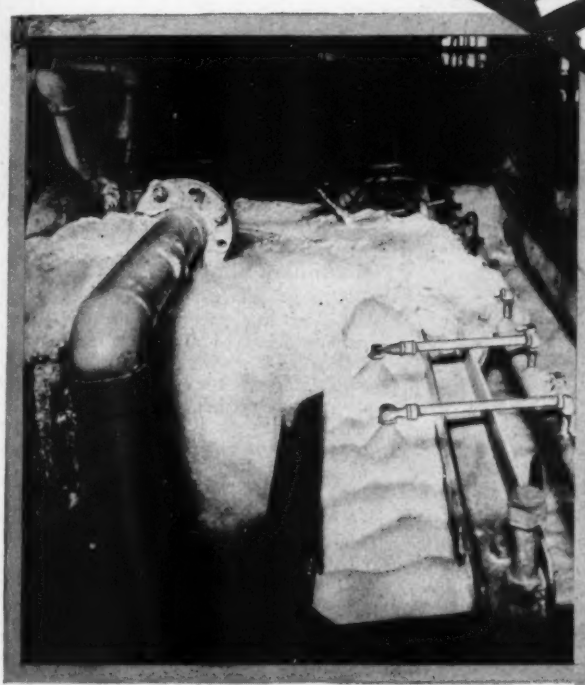
In the operation of this pilot plant both paper machine waste water and main sewer mill wastes were treated *without added coagulant.*

With this background of test and pilot plant data, and the experience gained in the operation of many water softening and clarification plants, a waste water treating plant having a capacity of 2100 gpm using these developments was placed in service late in 1943 for recovery of solids from a board mill waste water; and to clarify the water sufficiently to permit disposal.

At the time the sale of this equipment was negotiated, this waste water had a suspended solids content of 1.6 to 2.0 pounds per 1,000 gallons and testing procedure previously described indicated that a clarified water containing about 0.1 pound suspended solids per 1,000 gallons could be produced, an indicated solids removal of about 95%. However, by the time

(concluded on page 146)

NOPCO-KF did THIS in 5 minutes!



Head-box in leading paper mill, showing obstinate foam condition.

Foam practically eliminated 5 minutes after NOPCO-KF was added to the suction side of the fan pump.

RESULT - Paper Quality Stepped Up Even at Increased Machine Speeds

More and better paper is being turned out for mills using NOPCO-KF. No matter how great the volume or speed of production, NOPCO-KF helps make paper and paperboard of more uniform quality. Even when operating at capacity, entrained air—the common cause of thin spots in paper—is dissipated as effectively as if the stock were being handled at slower speeds, because NOPCO-KF keeps "working" *even on the wire.* Obviously, production increases—quality improves.

53% Fewer Thin Spots

That's the NOPCO-KF average, due to its super "bubble-busting" power. The pictures above clearly show what NOPCO-KF does to bubbles in a few minutes. Without it — sheet formation suffers. With it—sheet formation is uniformly fine, for NOPCO-KF is a chemical substance expressly formulated to aid sheet formation. See for yourself. Order enough for a trial run. Write, wire, phone or use the coupon.

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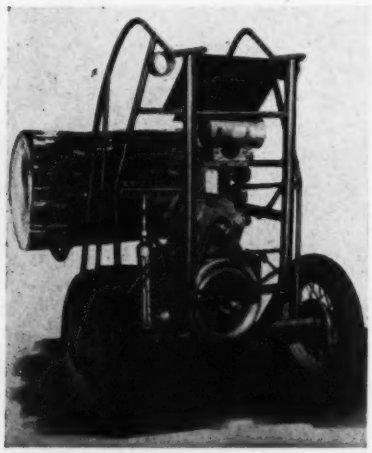
NEW EQUIPMENT AND SUPPLIES

Portable Pulpwood Loader

The Noble & Wood Machine Co., Hoosick Falls, N. Y., has announced the E-Z Portable Loader for pulpwood handling. Designed primarily for the loading of pulpwood on trucks, the loader has a lifting capacity of approximately 1000 pounds.

The frame of the loader is of welded steel construction. It is mounted on automobile wheels, rubber tired to absorb shock and prevent damage in transportation. Provision also has been made for attaching trailer hitch to the loader for towing.

The loading fork is actuated by a five hp. gasoline motor operating through a friction clutch and gear reduction unit. The fork remains in the down position for a definite interval during each cycle to facilitate loading.



According to the manufacturer, approximately 5½ cords of 4½ ft. wood averaging 16 in. in diameter can be loaded on a truck by the loader in 30 minutes.

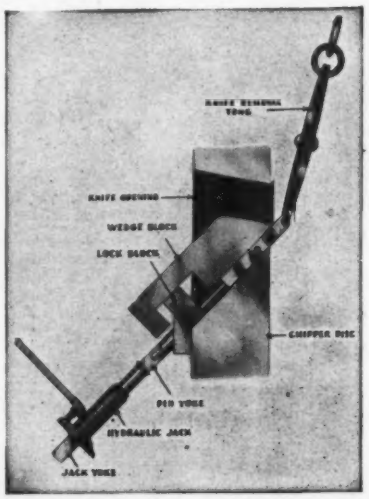
Heat Resisting Paint

Quigley Co., Inc., 527 Fifth Ave., New York 17, N. Y., has announced *Triple-A High Heat Resisting Paint.* This paint, shipped in the proper consistency for application, can be sprayed on hot surfaces where a shutdown is inconvenient.

The resistance of the paint to heat depends on the surface to which it is applied. On light steel, it will adhere under rapid heating and cooling up to 1,400 Fahr. On alloy steel, brick, etc., it will stand 2,500 Fahr. or over. It is noninflammable, nonirritating, and does not give off fumes or odors when being applied, upon drying, or when subjected to heat or flame.

Tools for Removing Chipper Knives

D. J. Murray Manufacturing Co., Wausau, Wis., has announced the development of a new method for removing chipper knives from chipper discs. The method incorporates the use of two tools: namely, a hydraulic jack or similar appliance and a pair of knife removal tongs. The jack or similar appliance is used to push the knives out of the knife pockets; the tongs to remove them after they have been ejected a sufficient distance.

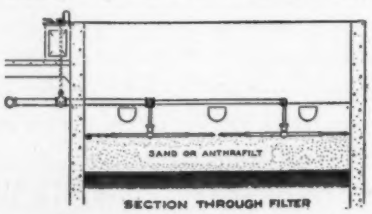


According to the announcement, this method of knife removal eliminates the danger of accidents to workmen which results from the dropping of knives, and also assures speedier removal and changing of knives.

Filter Bed Agitator

A hydraulic mechanism for washing the sand or other filtering medium in a water filter free of mud and other turbid matter has been announced by the Palmer Filter Engineering Co., 882 East 8th St., Erie, Pa., patentee and manufacturer, and Stuart-Brumley Corporation, 516 North Charles St., Baltimore, Maryland, sales agent.

Designed as the *Palmer Filter Bed Agitator,* the device is essentially a pipe provided with nozzles and supported on a bearing to permit it to be rotated. The



bearing and pipe are suspended from a pressure water line above the filter at the proper elevation to allow the pipe (agitator arm) to just clear the top of the bed.

The agitator is used in conjunction with the back wash. First, the back wash is turned on sufficiently to cause the sand to become fluid. Then, when the bed is in this fluid state, the valve on the pressure water line to which the agitator is connected, is opened, thus causing water to be emitted from the agitator nozzles.

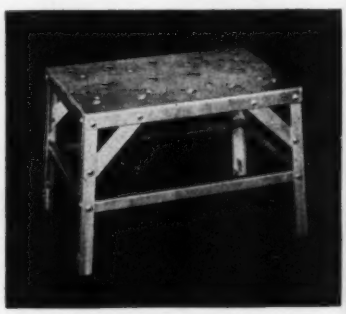
The reaction of the water from the nozzles causes the arm to rotate in the expanded filtering medium. The high velocity of this water (approximately 70 feet a second), operating in a nearly horizontal direction, causes infringement of the grains in such a way as to set up a scouring action.

Only a sufficient rate of back wash is used to cause the bed to become fluid and to carry away the turbid matter.

According to the announcement, the use of the agitator will save up to 40 per cent in wash water, will eliminate bypassing due to mudded areas and cracked beds, and will eliminate the need for removing sand from bed for cleaning.

Aluminum Bench

A line of aluminum benches or stools for use in wet or slippery workplaces has been announced by The Aluminum Ladder Co., 366 Carbis St., Worthington, Pa. The feet of these benches can be supplied with wooden shoes or left plain, as desired.



The bench in the illustration is made of hard alloy aluminum. It is 12 in. wide, 18 in. long, and 15 in. high. It weighs 5½ lb.

Water-Resistant Adhesives

Paisley Products, Inc., 1770 Canalport Ave., Chicago 16, Ill., has announced four water-resistant adhesives under the following respective designations: Nos. 3130, 4016, 676, and 688. These adhesives are of the emulsion type, the adhesive and resin solids in the form of tiny particles or droplets being suspended in a water solution.

No. 3130 is a reclaim rubber and resin emulsion; No. 4016, an asphalt and rubber emulsion; No. 676, a vinyl polymer emulsion; and No. 688, a vinyl polymer-starch adhesives.

In addition to being non-inflammable and free from objectionable odors, the manufacturer claims that they permit fast sealing as they can be water diluted to spread freely and evenly without brush drag. When used on asphalt laminated and impregnated papers and V-board, the emulsion penetrates the paper fibers and releases the resin film as the water insoluble bonding agent. The final adhesive film, according to the manufacturer, when completely dry, is resistant to ex-

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Air Bubble Type Level Recorders

Masoneilan Recorders provide instant, accurate information on all types of stock level resulting in substantial savings by reducing overflowing and subsequent wastage. The low initial cost, simplicity of operation and accuracy enable the Masoneilan 2010 to pay for itself out of savings.

Check these advantages of the Masoneilan Stock Level Recorders—

- Provide the operating floor with a 24-hour check of stock levels.
- Provide important data which enables you to prevent extreme high or low levels in stock tanks and chests.
- Prevent wastage from overflows.
- Give operators first-hand information on all levels whether nearby or several hundred feet distant.
- Eliminates manual measuring or inspection of stock chest level.

Masoneilan Recorders are also ideal for keeping a check on white water tank levels, bleach storage chests, couch pits, thickeners, washers, save-alls and head boxes. Standard ranges in inches of water to 50 ft. head. They can be furnished with electric switch for high and low contact for remote operation of signal lights and alarms. *Write for complete information today.*

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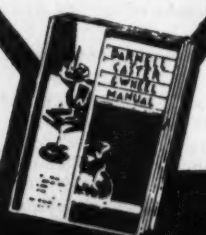

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tremes of heat, cold, humidity, and complete water immersion with a margin over the usual specification tests.

New Line of Valves

The Ohio Injector Company, Wadsworth, Ohio, has announced a new line of cast steel globe angle valves. Available in 150 and 300-pound pressure classes, the valves are offered with either spherical or plug type discs and seats and in a number of trims.

Two-Speed Hydraulic Foot Pump

Lyon-Raymond Corp., 2042 Madison St., Greene, N. Y., has announced a two-speed hydraulic foot pump for pressures up to 10,000 psi. The pump has two pistons—a high speed, low pressure piston; and a slow speed, high pressure piston. Both pistons pump oil up to 1000 lb. pressure. The high speed, low pressure piston automatically cuts out at 1000 lb.; and the higher pressures (up to 10,000 lb.) are developed by the high pressure piston.

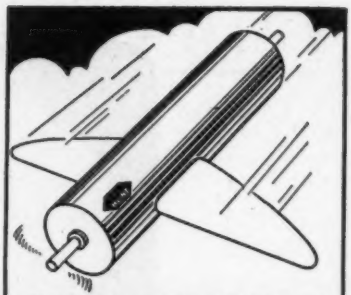
The pump is self-contained, and is designed for continuous, heavy duty. It can be furnished with a base suitable for mounting or with a base that permits it to be used on a floor without fastening.

Protective Sleeves

The B. F. Goodrich Co., Akron, Ohio, has announced the addition of protective sleeves to its line of industrial clothing. These sleeves, made of fabric coated with vinyl resin, are lightweight, pliable, black outside and olive drab inside, and have a length of between 16 and 17 inches. According to the announcement, they are particularly valuable for workers who need protection against oils, most acids and alkalies.

Skid-Loader for Pulpwood

Hi-Way Service Corp., 3841 W. Wisconsin Ave., Milwaukee 8, Wis., has announced the *Drott Skid-Loader* for the handling of pulpwood. The unit consists of a steel frame with a rack attachment and is mounted on a 60-h.p. Diesel tractor. Hydraulically operated, it has a lifting capacity of 6,000 pounds and a loading height of ten feet.



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FOR WET FELTS
plus patented features that give greater value.
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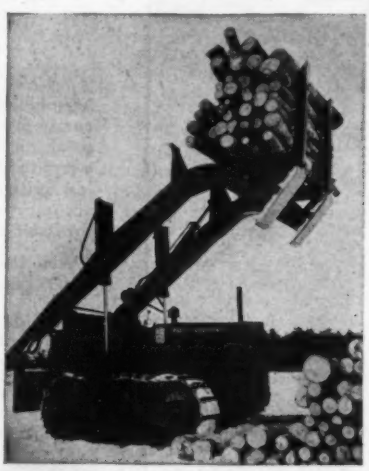
The rack which holds the wood is made up of two separate lower arms and two joined top arms. The lower arms are pushed into a stack of pulpwood by the forward motion of the tractor and the load is then clamped tight by the top arms pressing down hydraulically. The load is then lifted upward and tilted toward the unit. The tractor backs away, lowers the



wood and skids it to the place of disposal. Here it may be piled, or loaded into truck, sled or flat car.

According to the manufacturer, the loader will move a cord of pulpwood from pile to truck in one and one-half minutes.

THE "ONE BEST" WAY

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Rollway right-angle loading splits compound loads into the two components of *pure radial* and *pure thrust*. It carries each of these components on separate bearing assemblies, at right angles to the roller axis. No oblique loads or load resultants, no compound loads of any form, can bear on either the radial or thrust rollers. Unit pressures are lower. Total load magnitudes per bearing are held within calculated limits. Maintenance and replacement costs are substantially reduced. Send a drawing, or detailed description for free bearing analysis and recommendation by our bearing specialists. No obligation.

Soon, very soon, equipment users are going to refuse to buy "just anything" they can get. During and after reconversion, they're going to pick and choose . . . to demand higher performance levels and lower maintenance costs. Bearings will be basic in new equipment specifications.

That's when Rollway solid-cylindrical Roller Bearings will count high in closing orders. Because Rollway right-angle loading is *"the one best way"* to combine radial and thrust loads . . . the way that reduces unit pressures and cuts down-time for bearing service and replacement.

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Syracuse 4, N. Y.
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TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Ghost Printing on Coated Paper by Invisible Offset

When gloss inks are applied to coated papers, a part of the vehicle sweats out of the ink gel (i.e., syneresis occurs). This requires about 48 hours in a pile of printed sheets. The oil separating from the ink gel during storage of one sheet is picked up by the superimposed sheet in the form of an exceedingly thin film. This is invisible under ordinary light, but can be detected very readily by fluorescent light. The film is probably due to some of the less reactive part of the linseed oil vehicle. It was found to be impossible to print over this thin film when it was freshly deposited, but in time, due to some chemical change, ink was no longer prevented from "taking" on the paper surface.

A number of coated papers from Canadian and U.S.A. mills exhibited this phenomenon—most papers, however, being sufficiently porous to absorb the oil film almost as rapidly as it was exuded out of the ink gel. Thus with most coated papers the printing operation was not interfered with. In the ghost printing referred to, the catalog cover paper under examination had a very hard surface that absorbed the oil only very slowly. The film was thus retained and ink deposition was prevented.

The authors show that ghost printing is preventable when the hardness and absorbency of the papers are controlled. The surface properties may be gaged by measuring resistance of the paper surface to mineral oil penetration by the Larocque method. Reproduction of photographs taken by ultraviolet light are given. H. B. Marshall and A. M. Birks. Indian Print and Paper (Calcutta) No. 39, March 1944, 41-3 (Cf also The Canadian Printer and Publisher).

Classification of Groundwood Pulps in Germany

The method first used was the official one given in "Merkblatt 201," and by means of this the authors examined 90 commercial softwood pulps. These included the so-called "finest stock," fine-stuff, normal groundwood, coarse stock, "wood fiber" and refiner stock. From these pulps, handsheets were made and their physical properties were determined. Comparisons were also made between German and Finnish, Swedish, and Norwegian pulps. Although the properties of the coarser stocks served to differentiate them from the finer ones, it was not possible to delimit the finer and the normal pulps by the usual methods. Furthermore, it was shown that the terms "fine stuff" and "normal groundwood plup" do not mean the same thing in Germany as they do in Scandinavia. The authors propose to establish nine separate classes of groundwood pulp, based on the following data: (a) coarse screenings (slivers and shives), (b) material retained by a 16-mesh screen, material passing a 48-mesh screen, and deg. Schopper-Riegler, breaking length, and bending endurance, of handsheets made from the pulp. Maximum (or minimum) values are tabulated for all nine classes, and the claim is made that this new classification serves in identifying every commercial sample within its appropriate class. W. Brecht and R. Suttinger. Papier-Fabr. Wochbl. Papier-Fabr. (1944) No. 3, 96-103. (Reprinted by the Alien Property Custodian.)

Burning of Sulphite Waste Liquors

The author makes a report to the German Sulphite Waste Liquor Association in which the developments in concentration and burning of waste liquors (during 1942-3) are fully discussed. The experimental basis for this work is given in another paper (Papier-Fabr. 40, 193 (1942)). von Lassberg. Papier-Fabr. Wochbl. Papierfabr. (1944), No. 4, 123-7. (Reprinted by the Alien Property Custodian.)

Hemicellulose Hydrolysis with Unfermented Sulphite Waste Liquor

By heating under pressure with unfermented sulphite waste liquor, wood hemicelluloses may be advantageously hydrolyzed and 20-22% of the wood is converted into reducing sugars. When the ratio of the wood to liquor was about 1 to 4.4, the total sugar content of the liquor rose from its initial value to 7-8%. When the ratio was 1 to 3, the sugar content was about 10%, and at a ratio of 1 to 2, it reached 14-16%. The resulting mash, with its increased sugar content, furnishes alcohol the distillation of which requires about one-half as much steam as that usually used. Control fermentation experiments with waste liquor alone, and also with the enriched liquors indicate that the sugars resulting from the wood hydrolysis are fermentable to the extent of 70-75%, when the wood chips were heated for 40 minutes at 145 C. with the liquor. Although the liquor is also capable of hydrolyzing true cellulose, the process is not economical.

In cases where this type of hydrolysis is required, it is well to enrich the original waste liquor with SO_2 and to carry out the final stage of the hydrolysis with sulphurous acid. Auxilliary hydrolyses with inorganic acids (like sulphurous or sulphuric) proceed smoothly if the proper temperatures are used and the heating is several times repeated. The structure of wood chips that have been treated with waste liquor alone show no very obvious change in physical structure, but they cannot be pulped by the sulphite process. However, the chips may be pulped by the kraft process and give pulp with normal properties. Thus it is possible to get fermentable sugars as by-products, in the (subsequent) production of sulphate pulp. The original gives tables and graphs. H. Roschier and Leo Karppinen. Finnish Paper Timber J. 25, 40-9 (1943) through Chem. Zentr. 1943, II, No. 21, 1930.

Physico-Chemical Studies On Sulphite Waste Liquors

The liquors examined included: unfermented, purified and unpurified beechwood sulphite and fermented spruce sulphite waste liquors. Dried powders prepared from these were also studied. The color changes observed when these liquors were concentrated, were followed by means of a Lange photoelectric colorimeter and light absorption was plotted against liquor concentration.

With a specific waste liquor it was found that light absorption is a function of the concentration, even when these concentrations are quite high. Different liquors naturally give rise to different absorption curves. With increasing pH (between the ranges of pH 3 and pH 9) absorption shows a marked increase, with the pH having a greater influence at lower than at higher concentrations.

A marked increase in light absorption occurs when either the solutions or dry powders are heated, and the longer the heating period and the higher the temperature of heating, the greater is this effect. The viscosity of sulphite waste liquors was also studied and it was found that the lower the temperature, the higher the viscosity. The viscosity of spruce liquors was higher than that of the beechwood liquors, and these differences are discussed. At higher temperatures of viscosity measurement, the effect of pH is not very great.

In a series of experiments, the liquors were evaporated to constant weight and the dry residues were then heated at various temperatures. When the heated powders were then redissolved to form 40% solutions, the latter showed marked viscosity differences depending on the temperature used in the preheating period. The higher this temperature, the greater was the rise in viscosity. This was more marked in the case of spruce than in beechwood. The so-called "molecular weights" of the solids obtained from spruce liquors were higher than those from beechwood liquors. When powdered lignosulphonic acids were heated and then dialyzed, the molecular weights of the solids increased with the temperature, with the time of heating and also with the length of the dialysis period. The molecular weight increases were greater for products obtained with spruce than those from beechwood lignosulphonic acid. K. Schwabe. Papier-Fabr. Wochbl. Papierfabr. (1944) No. 4, 115-23. (Reprinted by the Alien Property Custodian.)

Turning the tables on wear and corrosion

These 4" diameter x 118" face rolls, built by the Black-Clawson Co., Hamilton, Ohio, serve as table rolls; others are used for felt rolls, guide rolls, submersion rolls.

> Our experience with these rolls has been very satisfactory and considerably better than with other types.
>
> We definitely plan to continue with them.

That's the opinion of a mill which has had 5 years of experience with Monel table rolls built by the BLACK-CLAWSON COMPANY.

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NO SAG. *The seamless Monel tubing* from which these rolls are built, is practically *twice* as resistant to deflection as other non-ferrous metals ordinarily used. (Modulus of elasticity of Monel is 26,000,000 psi.)

LIGHTWEIGHT—yet STIFF. Monel's strength and high resistance to deflection permits relatively thin wall thickness.

CORROSION-RESISTANT. Monel resists corrosion and pitting by paper stocks and white waters, alkaline cleaning solutions or dilute sulfuric and hydrochloric acids.

INHERENTLY TOUGH and HARD. Monel rolls resist wear and grooving by doctors or abrasives in furnish. Average hardness of Monel tubes is 210 Brinell.

NO STRENGTH LOSS due to dezincification. Monel contains no zinc.

Cold-drawn, seamless Monel tubes for rolls are produced in diameters up to 5 inches, and in lengths over 20 feet. Full data on sizes, wall thicknesses and tolerances will be sent promptly upon request.

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PAPERMAKING PATENTS

IN THE UNITED STATES—Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington 4, D. C.

Composition for Coating and Laminating Sheet Materials

Patent No. 2,348,687. Allen Abrams and George W. Forcey, Wausau, Winfred H. Graebner, Neenah, Alfred M. Heald, Wausau, and George G. Rumberger, Neenah, Wis., assignors to Marathon Paper Mills Company, Rothschild, Wis., a corporation of Wisconsin. No Drawing. Application November 30, 1942, Serial No. 467,466. 16 Claims. (Cl. 106—219).

1. A composition for coating sheet materials comprising a major proportion by weight of microcrystalline wax and an aluminum soap of a higher fatty acid, said composition having been transformed from a thixotropic gel of maximum viscosity to a less thixotropic condition approaching the Newtonian condition as determined by a Brookfield Synchro-lectric viscosimeter at 250° F., and being in a homogeneous, spreadable, rheological state for forming smooth, non-penetrating, adherent, flexible coatings.

Continuous Beater and Pulp Selector

Patent No. 2,351,728. Harold Donald Wells, Glens Falls, N. Y. Application August 8, 1942, Serial No. 454,180. 7 Claims. (Cl. 92—23).

1. A pulp beater and selector comprising a beating and circulating tank, one wall of said tank having a selected pulp outlet, a circular beater-and-circulator in said tank and rotatably mounted on an axis perpendicular to said wall, said beater-and-circulator covering said selected pulp outlet and forming the sole means for barring direct discharge of the tank contents there-through, said beater-and-circulator being spaced sufficiently inward from said wall to leave a restricted annular screening passage between the bottom edge of said beater-and-circulator and the underlying portion of said wall through which properly reduced pulp may flow to said outlet, and means for driving said beater-and-circulator.

Method of Watermarking Coated Paper

Patent No. 2,344,783. George C. Munro, Hamilton, Ohio, assignor to The Champion Paper and Fibre Company, Hamilton, Ohio, a corporation of Ohio. No Drawing. Application October 2, 1940, Serial No. 359,417. 6 Claims. (Cl. 117—10).

1. Method of marking two-side-coated paper with a plurality of substantially parallel lines which shall be plainly visible by transmitted light but relatively inconspicuous on both printed and unprinted parts of either surface of the paper when viewed in the normal manner by reflected light, in which the paper, as it passes from the final operation in the coating process on its way to the drying operation, passes over a plurality of small-area, low-velocity steam jets spaced the same distance apart as the required parallel lines, said steam jets being located in close proximity to the path of the paper, all jets being formed at substantially the same distance from the paper surface, and directed against the wet surface of the coating at an acute angle and in the general direction of the paper travel.

Wetproof Cigarette Paper

Patent No. 2,348,324. Allen M. Bond, Jr., Louisville, Ky., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky., a corporation of Delaware. No Drawing. Application May 21, 1941, Serial No. 394,482. 4 Claims. (Cl. 131—15).

1. A wet-proof cigarette paper consisting of cigarette paper coated with aluminum stearate in an amount of the order of 0.05 to 0.2 pound of dry aluminum stearate per one thousand square feet of cigarette paper.

Method for Coating Paper

Patent No. 2,339,707. Otto Kress and Charles E. Johnson, Appleton, Wis., assignors to The Institute of Paper Chemistry, Appleton, Wis., a corporation of Wisconsin. No Drawing. Application December 13, 1939, Serial No. 308,944. 2 Claims. (Cl. 106—142).

1. In the paper art, the method of brightening and opacifying paper which comprises treating a pre-formed paper web with an aqueous emulsion consisting essentially of a volatile hydrocarbon liquid with a flash point of about 115°–150° F., a water-soluble soap and an alkaline dispersion of casein, and thereafter subjecting the treated web to a drying treatment in order to evaporate the liquid material of said emulsion including the hydrocarbon liquid and leave the casein on the surface of said web in extremely fine particle size.

Apparatus for Screening Paper Pulp

Patent No. 2,338,904. Edwin Cowles, Cayuga, N. Y., assignor to The Cowles Company, Princeton, N. J., a corporation of New Jersey. Application April 11, 1940, Serial No. 329,037. 3 Claims. (Cl. 92—32).

1. In an apparatus for screening paper stock, in combination, a screen, resilient means in abutting contact with one face of said screen along the edges of said screen around the entire periphery thereof and sealing the edges of said screen to prevent flow of stock between said screen and said resilient means, additional resilient means in abutting contact with the same face of the screen and distributed at spaced intervals over the surface thereof, and means to apply magnetic force intermittently to the screen over substantially the entire area thereof to draw said screen uniformly against all of said resilient means to compress the same substantially uniformly throughout the area of the screen.

Treatment of Paper Mill Wastes for Recovery . . .

(continued from page 138)

the equipment was placed in service, mill production had been stepped up and, as a result, the equipment was called upon to handle a waste water containing from 4 to 10 pounds suspended solids per 1000 gallons. This high concentration of solids applied to a machine designed to handle much lower concentrations; the presence of rags, cellophane and other foreign material of large size which clogged waste water inlet distributor and slurry discharge facilities; and air leakage in the pump supplying the waste water to the treating plant, caused operating difficulties and resulted in poor separating efficiency.

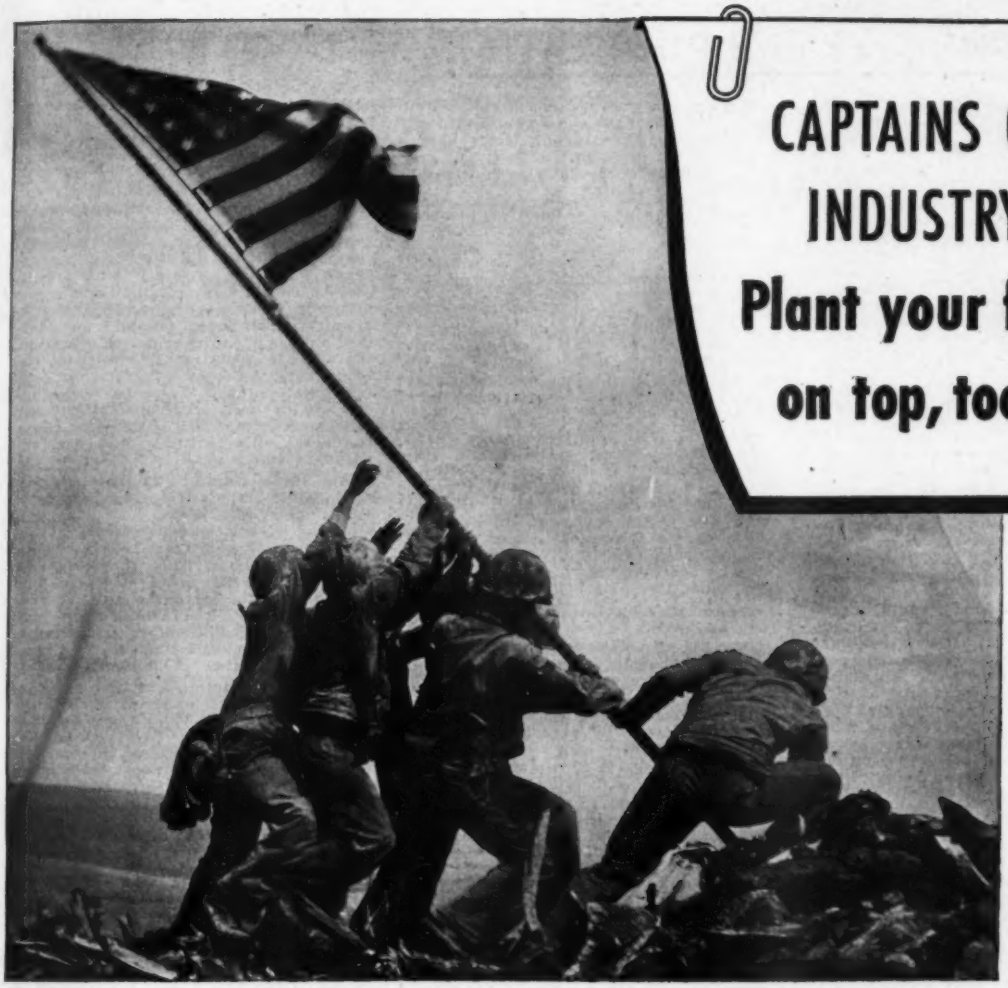
Elimination of air leakage at the supply pump overcame a troublesome flotation effect; field changes in the waste water inlet distributor eliminated clogging previously experienced at this point; and field changes in connection with the slurry concentrating compartments further improved the operation. Considerable additional work remains to be done in the way of enlarging sludge blowoff and concentrator discharge piping to eliminate clogging by rags, cellophane, and similar foreign material which should be removed by screening prior to treatment.

In the treatment of this waste water, addition of a coagulant is necessary to obtain satisfactory recoveries, and alum dosages of 5 to 8 grains per gallon (0.7 to 1.14 pounds per 1000 gallons) have been found necessary with coagulant dosages of this order, and with the plant operated at (66 to 75%) of its rated capacity, results such as the following have been obtained:

Results of this nature are not consistently obtained under present operating conditions but they are indicative of the possibilities of equipment of this type for such service when operated within the limits for which it is designed. On the basis of experience to date, there is confidence that equipment can be provided for waste water treatment which will consistently produce a clarified effluent averaging 0.088 pound suspended solids per 1,000 gallons (10 ppm) or less; and delivering a thickened, recovered slurry of fiber and filler containing 50 to 100 pounds, suspended solids per 1,000 gallons.

TABLE I.—POUNDS SUSPENDED SOLIDS PER 1000 GALLON

Waste to Treating Plant	Clarified Water	Sludge Discharge	Recovery
lb.	lb.	lb.	%
6.25	0.35	36.2	94.5
9.60	0.325	34.1	96.5
8.00	0.80	38.7	90.0
7.75	0.30	...	97.0
6.2	0.12	40.0	98.0
8.62	0.14	35.7	98.5
4.95	0.14	40.5	97.3
9.75	0.13	41.3	98.5



CAPTAINS OF INDUSTRY Plant your flag on top, too!

This year we've got to make 2=3!

This year we've got to make 2=3! We've got to lend Uncle Sam in 2 chunks almost as much as we lent last year in 3. Which means that, in the approaching 7th War Loan, each of us is expected to buy a BIGGER share of extra bonds.

The 27 million smart Americans on the Payroll Savings Plan are getting a headstart! Starting right now they are boosting their allotments for April, May and June—so that they can buy *more* bonds, and spread their buying over *more* pay checks.

Our Marines went over-the-top at Iwo Jima in the greatest, and hardest, battle in the Corps' history. Now it's *your* turn! Your quota in the 7th is needed to help finish this war, sidetrack inflation, build prosperity. So, captains of industry, plant your flag on top—like the Marines at Iwo Jima!

★

CAPTAINS of INDUSTRY—here's your *Check List* for a successful plant drive:

- ★ **Get your copy of the "7th War Loan Company Quotas" from your local War Finance Chairman. Study it!**
- ★ **Determine *your* quota in E Bonds — the backbone of every War Loan.**
- ★ **Arrange for plant-wide showings of "Mr. & Mrs. America"—the new Treasury film.**
- ★ **Distribute "How to Get There"—a new War Finance Division booklet explaining the benefits of War Bonds.**
- ★ **Circulate envelopes for keeping bonds safe.**
- ★ **Display 7th War Loan posters at strategic points.**
- ★ **And—see that a bench-to-bench, office-to-office 7th War Loan canvass is made.**

★

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The Paper Industry and Paper World

★ *This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council* ★

New Catalogues and Publications

Allis-Chalmers Manufacturing Company, Milwaukee 1, Wis.—A manual has been published by this company for its supervisory force under the title, "You and the Returning Veteran, a Guide for Foremen." While based on the company's own experience in employing more than 1,100 veterans of this war, the assistance of the Wisconsin Society for Mental Hygiene was asked to make it as complete as possible. Copies will be sent without cost to any interested group or employer to assist them in dealing with veterans. Also just released by this company is a new bulletin, No. B6351, on single suction pedestal type centrifugal pumps. These pumps, developed for use where close-coupled motors are not practical, are driven by electric motors, steam turbines, gasoline or Diesel engines, direct connected and through Texrope V-belts and flat belts.

Bailey Meter Company, 1050 Ivanhoe Road, Cleveland 10, Ohio—A 12-page bulletin just issued by this company describes its Pyrotron Electronic Resistance Thermometers in indicating, controlling and recording models for temperatures ranging between minus 100 Fahr. and plus 1200 Fahr. These Instruments are said to be well suited for marine, mobile or other classes of severe service since no galvanometers or millivoltmeters are used. In addition to listing the outstanding features of these thermometers, the booklet describes the electronic detector and motor control; gives definite information on: ranges, power supply required, speed of response, accuracy, sensitivity, installation, standard chart ranges, automatic control application, alarm contacts, temperature sensitive elements and measuring circuits. As for Bulletin No. 230-A.

Burrell Technical Supply Company, 1936-42 Fifth Ave., Pittsburgh 19, Pa. —A new folder, No. B-205, describes the Coleman Certified Buffer Tablets being put out by this company. The booklet contains calibration graphs for high Na Ion buffers, also tables showas well as catalogue numbers for coning formula numbers and composition, venience in ordering.

Cameron Machine Company, 61 Poplar Street, Brooklyn 2, N. Y.—A series of six folders on its different types of roll winding and rewinding machines has just been issued: 15-143 describing Camachine 15, designed to assure production of rolls at densities to suit needs of various customers; CT-CR-488 with specifications and description of the constant-tension center rewind; 44-W-643, high-speed roll-winder for paper or for fabric; 28-2D-244, in which Camachine 28-2D for those who require paper, paper board, composition or fabrics put up in uniformly wound rolls of face widths anywhere from ⅛ inch upward is described; 46-W-844, a bulletin about their heavy duty winder for all kinds of papers, fabrics, rubber and miscellaneous materials, and 26-1144, about the slitting unit for use with web-fed processing machines. Each folder is illustrated with photos and explanatory diagrams.

Cochrane Corporation, 17th Street and Allegheny Ave., Philadelphia 32, Pa.—Engineers interested in the treatment of feed water for high pressure boilers should write this company and ask for its Reprint No. 37, "Foodwater Treatment for High Pressure Boilers at Dow Chemical Company," by L. F. Wirth and C. E. Joos. Engineers in whose plants deterioration of copper and brass parts has taken place, because of ammonia contamination, will find helpful another bulletin, Reprint No. 39, "Removal of Ammonia from Boiler Feed Water."

Duo-Safety Ladder Corporation, Oshkosh, Wis.—Circulars describing their various types of safety ladders, both wood and aluminum alloy; ladder shoes and scaffolding, may be had from this company on request.

Eutectic Welding Alloys Company, 40 Worth Street, New York 13, N. Y.—A six-page folder, just brought out by this company, on its low temperature welding rods, concentrates on maintenance problems. The bulletin describes the Eutectic's exclusive procedure, by which its rods applied at low temperature to cast iron, steel, aluminum, bronze, etc., produce clean strong bonds, but leave welded parts easily machinable. Suggestions for salvaging parts are included.

Fischer & Porter Company, 946 County Line Road, Hatboro, Pa.—A profusely illustrated catalogue, Bulletin No. 92-C, which may be had from this company, describes their Rotasight Flow Rate Indicator. Construction details and applications of the instrument are clearly given. Also included are engineering dimensions, flow capacities and prices.

General Detroit Corporation, 2270 E. Jefferson Ave., Detroit 7, Mich.—Two timely pieces of literature can be obtained on request from this company. "Your Fire Protection Insurance Policy" is a 12-page folder describing and illustrating the seven basic types of fire extinguishers in everyday use, and the class of fire which each extinguisher is designed to combat most effectively. It also includes construction specifications and Underwriters Laboratories classifications. The second folder discusses the uses and features of the General Detroit's vaporizing liquid type fire extinguisher. Photographs, cutaway views and drawings illustrate the bulletin.

The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.— A new booklet just published by the B. F. Goodrich Company contains reproductions of 26 advertisements of its industrial rubber products during the last year, under the title of "Typical Examples of B. F. Goodrich Development in Rubber." The advertisements cover a wide variety of product applications, and show how rubber can be the answer to many perplexing problems.

Hercules Powder Company, Cellulose Products Department, Wilmington, Del. —Now available from this department is a handy pocket-size booklet containing a list of the chemicals made and sold by this department; the types available; their uses, and pertinent packing and shipping information. Under the title of "Chemicals for Industry" the booklet is designed as a useful aid to technical and non-technical persons interested in using such products in plastics, films, lacquers, adhesives, varnishes, chlorinated rubber, printing inks, and for the flameproofing, waterproofing and weatherproofing of textiles.

Ingersoll-Rand Company, Phillipsburg, N. J.—A valuable addition to the reference files of production and operation officials is Form 7022, a 20-page catalogue entitled, "Centrifugal Pumps for Pulp and Paper Mills," just issued by this company. It is a comprehensive and informative booklet, which covers all the pumping needs of the industry from the hydraulic barker to the coating room, and also, pumps for fire protection and plant water supply. Of special interest is the center spread featuring a flow-chart showing types of pumps used, and their positions in the various processes. Adding to the readability of the bulletin are the drawings of typical paper products and cross-section blueprints and charts. Each type of pump is explained as to its uses and construction, including variations in construction such as cradle mounting, double suction, axial and mixed flow, horizontal and vertical, and multi-stage.

Marlow Pumps, Ridgewood, N. J.— An interesting and valuable handbook on pumps, entitled, "Self-Priming Centrifugal Pumps," may be had from this company. The booklet explains in easy-to-understand style the principles of centrifugal action, the physics of pumping and the evolution of self-priming centrifugal pumps. In addition to basic engineering information, the bulletin explains the difference between the types of self-priming centrifugals; points out where self-primers can be used with best effect, and tells how to install and care for them. Ingenious illustrations add to the value of the booklet.

Mid-States Gummed Paper Company, 2515 South Damen Avenue, Chicago 8, Ill.—Copies of a large wall chart for shipping rooms showing how to seal cartons properly with no waste of tape may be had by writing this company. The chart shows in eight steps how sealing lines of cartons should be protected against rough handling and other shipping hazards, with maximum safety to carton and contents at a minimum expenditure of materials.

Minnesota Mining and Manufacturing Company, Saint Paul 6, Minn.— Just announced by this company is a new booklet, called "Arrived O. K." which will be of great interest to manufacturers with export packaging problems. Detailed information on adhesives made to meet government specifications to withstand rough treatment, extremes in temperature and high humidity, is included, as well as actual photographs to illustrate step-by step operations involved in sealing fibreboard and V-board shipping containers and water proof case liners for export shipment. Section headings are as follows: The Proper Method of sealing Fibreboard Boxes; How to Make a Good Waterproof Liner; How to Seal Small Packages; How to Seal Wooden Shipping Containers Using Preformed Liners; How to Seal Hard-to-Wrap Packages in Containers, and Two Easy Methods of Sealing Flaps.

Precision Scientific Company, 1750 N. Springfield Ave., Chicago 47, Ill.—Just off the press is Bulletin HP-1650, issued by this company, describing their line of Safety Heaters. It includes a temperature chart to be used in connection with the Heater.

Albert Ramond and Associates, 6300 Chrysler Building, New York 17, N. Y.— Just issued by this firm of industrial engineers is a booklet, "Production Management—and How It Affects Productivity, Costs and Employment." Procedures and policies helpful in the solution of the problems created by the tremendous wartime expansion of our productive capacity and working forces, based on experience in over a thousand plants, are outlined in this 40-page booklet, which includes 12 pages of pictorial diagrams and charts. Sections are devoted to work measurement; method improvement; labor cost and expense control; production control; job evalution; incentive wage plans for production workers, indirect workers and supervisors, and labor's attitude toward increased productive efficiency. Emphasis is put on the need for enlisting workers' co-operation in improvement programs.

Taylor Instrument Company, P. O. Box 110, Rochester 1, New York.—A number of important revisions have been made in the new Flex-O-Timer cataogue No. 98-154, just published by this company. These changes will be

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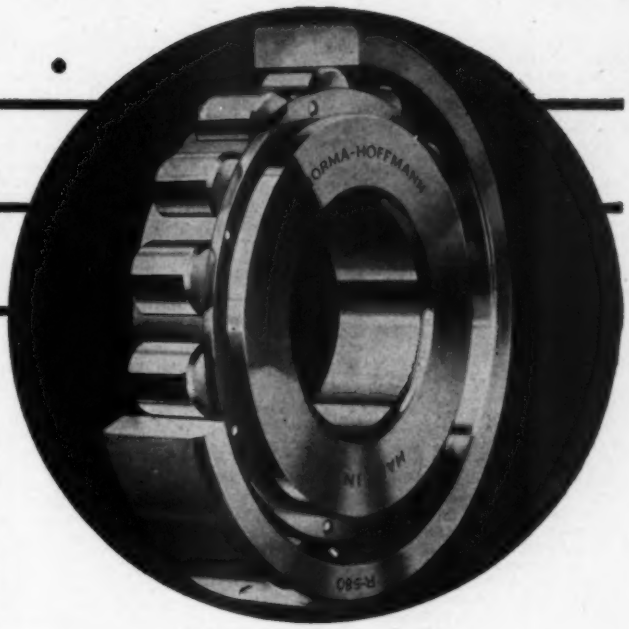

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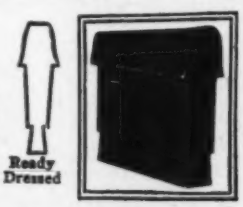

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of particular interest to production men in the paper and pulp industry who wish to increase output, improve quality or reduce cost by the use of time cycle controllers. One of the photos illustrates the application of a Flex-O-Timer to a wastepaper refiner.

The Torrington Company, Bantam Bearings Division, South Bend 21, Ind. —This company has announced a revised bulletin, No. 105, entitled, "High Capacity Ball Reciprocating Bearings," which covers a new list of recommended sizes. The high capacity ball bearing is designed for applications where ball bearing anti-friction qualities are desired in rotation, reciprocation, oscillation or combinations thereof. Also included are the operating capacities per row of balls for 100 r.p.m., based on an average life of 3,000 hours, and other important engineering data.

Sandy Hill Iron and Brass Works, Hudson Falls, N. Y.—Described in the latest of its series of broadcasts are: the Hill International Grinder, with illustrations of both the four-pocket Grinder and the three-pocket Grinder, intended for adequate control of quality in grinding smaller productions of pulp; its General Purpose Paper Machine, and illustrations of specialties and variations in design which can be supplied, and the Bertrams Fourdrinier Shake, together with information on the variable speed electric drive for the Shake.

Whiting Corporation, Harvey, Ill.—The publication of a catalogue covering its line of spray drying equipment, manufactured by the Swenson Evaporator Division of this company, has been announced. The eight-page, two-color bulletin shows clearly the application, operation and advantages of spray drying. A typical flow sheet for a milk drying plant is featured, with photos and drawings of other installations. Sent free on request for Catalogue No. D-100.

Books

The Blue Book of Southern Progress (1944 Edition)—The present volume brings the statistical data as well as other information which this publication presents from year to year up to date. It is a reference volume with plenty of facts and figures chronicling the development of the South. There is statistical information on manufacturing, mineral production, forestry, power, agriculture, transportation, construction, banking and finance as well as general economic data on each of the southern states. In addition, there is a list of state officials and important commissions of the several states, a list of Southern senators and representatives in Congress, and a list of Southern institutions of higher education. Priced at $2.00 a copy, the book is published by Manufacturers Record Publishing Co., Candler Building, Baltimore 3, Md.

Chemistry and Industry of Starch—The purpose of this book as expressed in its preface is to review and bring up to date the accumulated knowledge of starch and of the more important products derived therefrom. It is a volume of nearly 500 pages, containing 99 illustrations.

The book was edited by Ralph W. Kerr, Corn Products Refining Co., and co-authored by George V. Caesar, Stein, Hall & Co.; Leo M. Christensen University of Nebraska; Lloyd M. Cooke, Corn Products Refining Co.; Ed. F. Degering, Purdue University; Dexter French, Harvard Medical School; Alexander Frieden, Stein, Hall & Co.; Eric Kneen, University of Nebraska; J. M. Newton, The Clinton Co.; Aksel G. Olsen, General Foods Corp.; T. J. Otterbacher, The Miner Laboratories; George Peckham, Jr., The Clinton Co.; Garrish M. Severson, University of Nebraska, O. Robert Trubell, Corn Products Refining Co.; and William E. C. Yelland, Corn Products Refining Co.

Of 22 chapters, the following titles are examples: Occurrence and Varieties of Starch; The Manufacture of Corn Starch; Manufacture of Modified Corn Starches; Manufacture of Tapioca Starch; Manufacture of Wheat, Potato, and Other Industrial Starches Evaluation of Modified Starches in Practice; Physical Properties of Starch; Chemical Properties of Starch; Composition and Structure; Derivatives of Starch; Modification of Starch by Enzymes; Use of Starch in Paper Manufacture; and Starch Adhesives.

Published by Academic Press, Inc., 125 East 23rd St., New York 10, N. Y., the book is priced at $8.50 a copy.

Commercial Methods of Analysis—This volume of 753 pages shows the method of approach to analysis of innumerable complex commercial products and presents specific procedures for a wide range of determinations such as: Sulphur and Its Compounds, Minerals; Water; Fixed Alkalies and Alkaline Salts; Copper-Base Alloys; Saponifiable Fats and Oils; Sulphated Oil and Related Products; Lubricating Greases; Waxy Substances; Synthetic Resins; White Pigments, Extenders, and Mineral Fillers; Colored Pigments and Mineral Colors; Oil and Wax Emulsions; Coal; and Paper, Paper Fibers, Textile Fibers, and Starches. There also is a chapter on indicators, reagents, and volumetric solutions. Another chapter is devoted to qualitative analysis by micro and spot tests. The volume is the work of Foster Dee Snell and Frank M. Biffen (Photo-micrographs by George Lord). The price is $6.00 a copy; the publisher, McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 18, N. Y.

Conference Leader Training—Written by Edward S. Maclin, President of West Virginia Institute of Technology, and Paul T. McHenry, State Teacher Trainer, Trade and Industrial Division, West Virginia State Department of Vocational Education, this volume is a work book (or manual) in the conference method. The subject treated in the manual, as indicated by the chapter titles, follow: How to Use This Manual, The Conference as a Method of Instruction, The Conference Leader and His Job, Devices Used by Conference Leader, Training Conference Leaders, The Introductory Conference, Preparing Conference Outline, Practice Conferences, and Setting Up a Conference in Your Own Plant or Department. The book also contains a suggested list of topics for conference discussion, and a selected bibliography. Priced at $2.50 a copy, the publisher is National Foremen's Institute, Inc., Deep River, Connecticut.

How to Handle Labor Grievances—The scope of this book is indicated by the titles of the five parts into which it is divided: namely, Background and History of Grievance Procedures, Grievances and How to Deal With Them, Outline of Grievance Procedures, Grievance Procedures in Selected Industries, and Problems of Grievance Procedures. There also is a lengthy appendix in which are reproduced twenty-two grievance forms of leading American manufacturers. The author of this book is John A. Lapp; the publisher, National Foremen's Institute, Inc., Deep River, Conn. The price of the book is $4.00 a copy.

The Manufacture of Fibre Shipping Containers (Second Revised Edition)—Written by A. W. Werner, this paper-covered monograph, which first appeared serially during 1940-1941 in FIBRE CONTAINERS, then as a separate, has been brought up to date and extended in the present edition. The subjects covered by the text are: Requirement and Styles; General Specifications; Paperboard, Tests; Relationship of Tests, Machinery; Corrugated Creasing Wheel Contour Design; Scheduling Orders for the Double Cut-Off; Adhesives, Waterproofing and Other Coatings; Closures, Samples and Allowances; and the Salesman. Nicely illustrated, the monograph is priced at $1.75 a copy domestic and $2.00 foreign. The publisher is Board Products Publishing Co., 228 N. La Salle St., Chicago 1, Ill.

Seeing the Invisible — Written by Gessner G. Hawley, this book simply and interestingly tells the story of the electron microscope. It is a small book, yet it contains more than 70 illustrations. The text has been planned for the layman but it should give to the technical man, who is looking into the subject for the first time, some helpful background information. For example: the author, among other things, explains how the electron microscope works, discusses its limitations, gives something of its history, and tells something about its applications. The use of the electron miscroscope in the study of papermaking fibers, clay, etc., receives a prominent part in the text discussing applications. The book, published by Alfred A. Knopf, Inc., 501 Madison Avenue, New York 22, New York, is priced at $2.50 a copy.

Varnish Constituents—Written by H. W. Chatfield, Varnish Research Chemist and Departmental Manager, Messrs. Jenson & Nicholson Ltd., Stratford, London, England, this book has been issued by Interscience Publishers, Inc., 215 Fourth Avenue, New York 3, New York. The text takes up such subjects as varnish oils, acids, monoglycerides, natural spirit varnish resins, modified natural resins, synthetic resins, solvents and diluents, plasticizers, driers and other metallic soaps, antioxidants, asphaltums and pitches, waxes, rubber and chlorinated rubber. The book contains extensive bibliographical citations. It is a text of about 500 pages. The price is $7.00 a copy.

Wood Technology (Second Edition) —Authored by H. D. Tiemann, Senior Wood Physicist, U. S. Forest Products Laboratory and Lecturer in Forest Products, University of Wisconsin, this book treats of such subjects as: What Wood Is; The Life of a Tree and Its Relation to the Human Race; The Structure of Wood; How to Identify Species of Wood by Visible Structure; The Structure of the Cell Wall; Chemistry of Wood and Cellulose; Chemical Conversion of Cellulose and Synthetic Resins and Fibers; Paper and Pulp from Wood; Moisture Relations of Wood and Fiber-Saturation Point; Shrinkage and Swelling—Wood Compared with Other Materials; Collapse, Its Cause and Its Significance; Reduction of Shrinkage; Stresses in Drying Lumber, Moisture Gradients and Procedure in Kiln-Drying Operations; High Frequency Electrical Methods for Drying and Gluing Wood; Mechanical Properties of Wood and the History of Wood Research in the United States; Physical Properties, Density of Wood substance, Absorption of Liquids; The Effect of Various Periods of Different Temperatures and Humidities upon the Strength of Wood; Biological Destructive Agencies and Preservative Measures; and Distinguishing Features of American Woods. The book has a page size of 6 in. by 9 in., totals 336 pages, and is nicely illustrated. It is priced at $4.00 a copy. The publisher is Pitman Publishing Corporation, 2 West 45th St., New York 19, N. Y.

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CURRENT MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

OPA ceiling prices in sales to consuming mills delivered buyer's usual receiving point, with brokers' allowance not in excess of 5 per cent.

	per cwt.
Blue Overalls	-6.50
Corduroy, Men's	-3.50
Corduroy, Ladies'	-3.00
Washables, No. 1	-3.00
Percales	-4.75
New Soft Blacks	-3.75
Light Prints, No. 1	-4.50
Khaki Cuttings—	
Bleachable	-4.25
Unbleachable	-3.50
New White Canvas	-6.50
New Mixed Blacks	-3.25
Canton Flannels, Bleached	-7.00
Shirt Cuttings—	
New White No. 1	-7.25
No. 1 White Headings	-7.25
White Shrunk	-5.00
Silesias No. 1	-5.75
New Unbleached	-7.50
Fancy	-3.50
Linen Cuttings—	
American	-5.00
White	-14.00
Grey	-14.00

RAGS (Domestic)

f. o. b. New York City

OLD RAGS

OPA ceiling prices in sales to consuming mills f. o. b. cars at points of shipment, with brokers' allowance of $1 to $2 a ton depending on the value of the grade involved.

	per ton
Roofing—	
No. 1	31.00
No. 2	29.00
No. 3 and No. 4	27.00
Twos and Blues—	
Repacked	44.00
Thirds and Blues—	
Repacked	44.00
Miscellaneous	36.00
Whites, No. 1—	
Repacked	76.00
Miscellaneous	64.00
Whites, No. 2—	
Repacked	56.00
Miscellaneous	53.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING

f. o. b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	Nominal
Domestic	2.75 to 3.00
Wool Tares—	
Light	3.25 to 3.50
Heavy	3.50 to 3.75
No. 1 Scrap Bagging	2.65 to 2.90
Manila Rope—	
No. 1 large	-*115.00
No. 1 small	-*105.00
Sisal Rope—	
No. 1 large	-*95.00
No. 1 small	-*80.00
New Burlap Cuttings	5.50 to 6.00
Jute Threads—	
Foreign (Nom.)	6.00 to 6.50
Domestic	5.50 to 6.00
Strings—	
No. 1 sisal	-*80.00
No. 2 sisal	-*60.00
Soft jute	5.00 to 5.50
Mixed	1.75 to 2.00

*OPA ceiling price per ton f. o. b. shipping point.

WASTE PAPER

OPA ceiling prices f. o. b. points of shipment for machine compressed bales weighing not less than 500 pounds (with differential of $5 per ton less on certain grades for loose or bundled stock), and brokers' allowance of 4 to 9 per cent.

	per ton
Shavings—	
White Env. Cuts, One-Cut	67.50-
Hard White Env. Cuts	62.50-
Hard White, No. 1	57.50-
Soft White, No. 1	50.00-
Soft White, One-Cut	57.50-
Soft White, Misc.	43.00-
Fly Leaf, No. 1	33.50-
Fly Leaf, Woody, No. 1	25.00-
No. 2 Mixed Col. Woody	18.00-
Flat Stock—	
No. 1 Heavy Books and Magazines	38.50-
Mixed Books	22.00-
Ledger Stock—	
No. 1 White	46.00-
No. 1 Mixed (Colored)	40.00-
Manilas—	
New Env. Cuttings	53.00-
New Env. Cuts, One-Cut	57.50-
Extra Manilas	39.00-
Manila Tab Cards, Free of Ground Wood	45.00-
Ground Wood Manila Tab Cards	37.00-
Kraft—	
Envelope Cuttings	65.00-
Mixed Env. or Bag Cuts	55.00-
Tripled Sorted No. 1 Brown	50.00-
New 100% Cor. Cuts	45.00-
No. 1 Old Assorted	35.00-
News—	
White Blank	33.00-
Overissue	22.00-
No. 1 Baled	20.00-
Old Corrugated Containers	28.00-
New Corrugated Cuts	18.00-
Mill Wrappers	22.00-
Box Board Chips	14.50-
No. 1 Mixed Paper	19.00-

CHEMICALS

f. o b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.25-
Ground, cwt.	4.00-
Powdered, cwt.	4.40-
Blanc Fixe—	
Pulp, bulk, ton	40.00 to 46.50
Dry, barrels, pound	60.00 to —
Bleaching Powder—	
Drums, cwt.	2.25 to 3.10
Casein (Domestic Standard)—	
20-30 mesh (bags), lb.	22.00 to 24.00
80-100 mesh (bags), lb.	—
Argentine, lb.	17.50 to 18.50
China Clay—	
Domestic Filler Bulk (mine) ton	7.50 to 15.00
Domestic Coating Bulk (mine) ton	11.00 to 22.00
Imported (ship side) Bulk (lump) ton	14.00 to 26.00
Chlorine—	
Tank cars (wks) cwt.	2.00 to 2.25
Gelatine (silicin), lb.	.90 to .95
Glue. (C.P.) drums, lb.	18.25 to 18.75
Litharge, powd., bbl., lb.	.09 to —
Rosin (Gum)—	
New York, per 100 lbs.	
E	6.75—
F	6.85—
G	7.00—
WW	8.00—
Rosin (Wood), carlots	4.50-
Salt Cake—	
Dom. bulk (wks) ton	15.00 to 16.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	20.00 to —
Soda Ash—	
Bulk (works), cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt.	1.05 to 1.35
Soda (Caustic)—	
Solid, drums, cwt.	2.30-
Ground and flake, drums, cwt.	2.70 to 2.95
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg., 35 gal. drums, (works) cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	3.72-
Pearl, barrels, cwt.	3.83-
Paper (Sp.) bags, cwt.	3.83-
barrels, cwt.	3.93-
Sulphur (Crude)— (Mine) bulk, long ton	16.00 to—
Talc—	
Dom. 100 lb. bags (mine) ton	16.00 to 21.00
Imp. bulk, ton (Nom.)	—
Titanium Dioxide—	
Barium Pig., bbls., lb.	.05¾ to .06
Calcium Pig., bbls., lb.	.05 to .05¼
Zinc Sulphide, bbls., lb.	5.60 to 5.85

WOOD PULP

OPA maximum prices applicable to wood pulp delivered to consumer mills located East of the Continental Divide exclusive of Denver, Colo. (West of the Continental Divide and in Denver, Colo., ceilings are $6 per ton lower):

Bleached softwood sulphite	86.00
Unbleached softwood sulphite	74.00
Bleached hardwood sulphite	83.50
Unbleached hardwood sulphite	71.50
Northern bleached sulphate	86.00
Southern bleached sulphate	79.00
Northern semi-bleached sulphate	82.00
Southern semi-bleached sulphate	75.00
Northern unbleached sulphate	73.00
Southern unbleached sulphate	63.50
Bleached soda	76.00
Unbleached soda	72.00
Ground wood pulp	50.00
Ground wood—paper machine dried and mutilated	53.00
Sulphite screenings	43.50
Sulphate screenings	38.00
Ground wood screenings	32.00
Northern unbleached sulphate siderums	73.00
Southern unbleached sulphate siderums	63.50
Standard news print siderums	50.00

PAPER

f. o. b. New York City

	per ton
Boards—	
Binders	84.00-
Chip	50.00-
Chip, tube and can	52.00-
Chip, full-blending	54.50-
Chip, sgl. mla. lined	62.00-
Coated, white patent .010	80.00-
.020 and heavier	75.00-
Kraft liner	63.00-
News	50.00-

Book Papers—OPA base maximum prices per cwt. 4 cases or equivalent, f. o. b. mill with quantity, weight, manufacturing and other differentials allowed:

Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	8.25
B Grade E. F.	7.80
C Grade E. F.	7.55
D Grade E. F.	7.30
E Grade E. F.	7.05
No. 2 Uncoated Offset 4 sides. White	8.45
Coated White (Trimmed 4 sides)	
No. 1 Glossy	11.90
No. 2 Glossy	10.85
No. 3 Glossy	10.15
No. 4 Glossy	9.80
No. 5 Glossy	9.30
C2S Offset	10.40
C1S Litho (Varnish)	10.00
C1S Litho (Non-Varnish)	9.85

Writing Papers—OPA base maximum prices per cwt. on writing papers, f. o. b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond—	per cwt. 20 lb.	16 lb.
Extra 100% Rag	34.00	34.00
100% Rag	28.00	28.00
75% Rag	20.00	20.00
50% Rag	16.00	17.25
25% Rag	14.00	15.00

Rag Content Ledger—	per cwt. Zone 1
Extra 100% Rag	25.00
100% Rag	20.00
85% Rag	26.00
75% Rag	21.00
50% Rag	17.00
25% Rag	15.00

Sulphite Bond—	per cwt. 20 lb.	16 lb.
Air dry, watermarked	12.75	13.70
No. 1 (M. F.) watermarked	9.00	9.70
No. 2 (M. F.) watermarked	8.25	8.85
Plain (M. F.) unwatermarked	7.60	8.20

Sulphite Ledger—	per cwt. Zone 1
No. 1 (M. F.) watermarked	10.00
No. 2 (M. F.) watermarked	9.25
Plain (M. F.) unwatermarked	8.60

Glassine (f. o. b. mill)—	per cwt.
Embossed (25 lb. up)	13.75 to 14.25
Bleached (25 lb. up)	12.75 to 13.25
Unbleach. (25 lb. up)	11.50 to 12.00
Greaseproof—	
Bleach. (25 lb. up)	11.00 to 11.50
Unbleach. (25 lb. up)	10.00 to 10.50

News—OPA Ceilings—	per ton
Rolls, Standard (Contract)	61.00
Rolls, Lightweight (Cont.)	65.00
Rolls (Spot)	(Nominal)
Sheets	69.00

Tissues (Carlots)—	per ream
White, No. 1	1.12½ to 1.20
White No. 2	.90 to 1.00
Bleached Anti-Tarnish	1.15 to 1.20
Colored	—
Anti-Tarnish Kraft	.70-
Manila	.90 to .95
Napkins, semi-crepe (12¼ lb. to M shts.) per cs.	.60-
Napkins, full crepe and emb'sed (12¼ lb. to M shts.) per cs.	.60-
Toilet, Bleached (M shts.) per cs.	5.65-
Toilet, Unbleached (M shts.) per cs.	4.25-

Towels—	per case
Bleached	3.20 to 3.75
Unbleached	2.60 to 3.05

Wrappings (Kraft)—	per cwt.
Super-Standard	5.25 to 7.65
No. 1 Wrapping	5.00 to 7.40
Standard Wrapping	4.75 to 7.15
Standard Bag	4.37½

Wrappings (Sulphite and Bleached Kraft)—	
(Rolls, f. o. b. mill)	
Bleached Papers—	
M.F. & M.G. Waxing, 20 lb. (Carloads only)	7.25 to 7.50
(10,000 lbs.)	7.50 to 7.75
Drug wrapp. 35 lb.	7.00 to 7.25
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	5.50 to 5.75
No. 1 Butchers	5.75 to 6.00
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	6.25 to 6.50
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	6.00 to 6.25
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Manilas—	
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Wrapp. Mla. 35 lb. up—	
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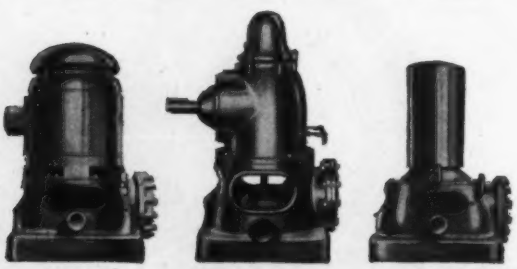

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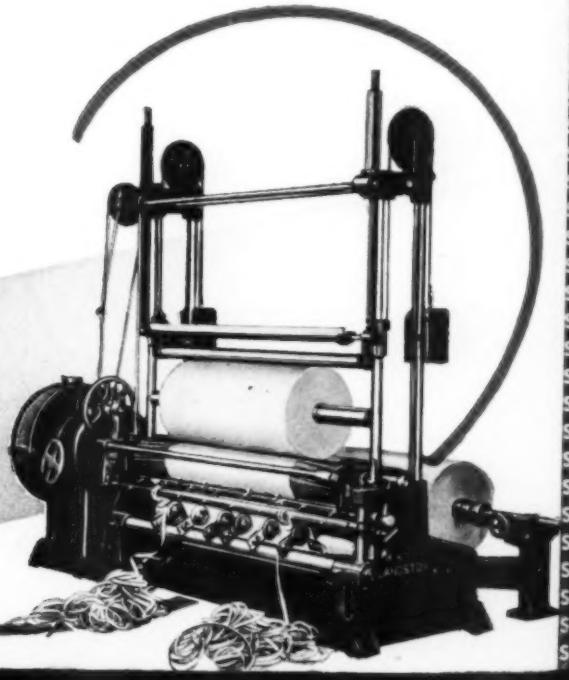

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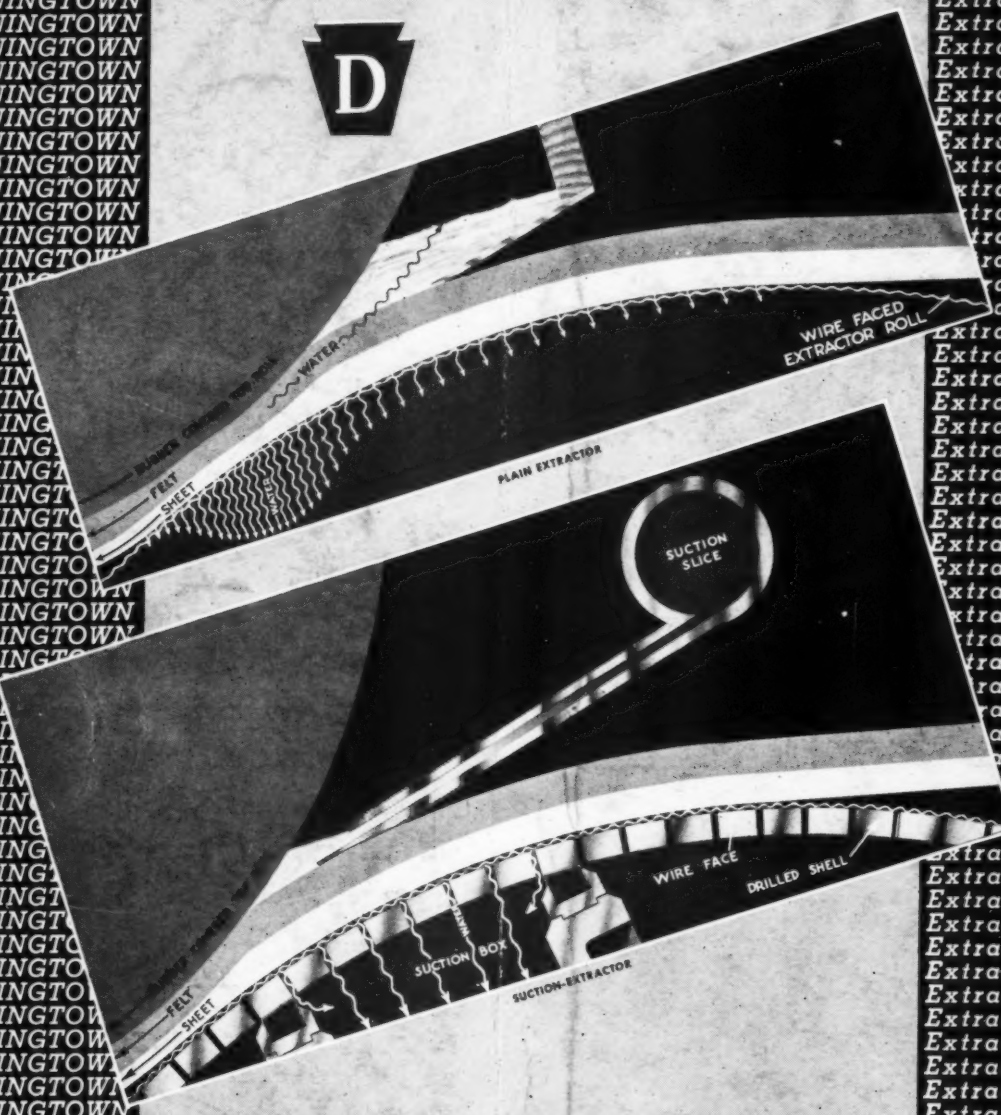

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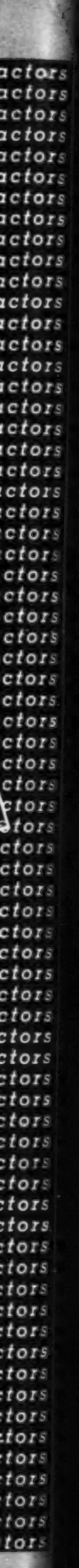
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